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THE

FLORA OF THE ALPS

VOLUME THE SECOND

LXXIX.—SOLDANELLA ALPINA.

THE

FLORA OF THE ALPS

BEING A DESCRIPTION OF ALL THE SPECIES OF FLOWERING PLANTS INDIGENOUS TO SWITZERLAND; AND OF THE ALPINE SPECIES OF THE ADJACENT MOUNTAIN DISTRICTS OF FRANCE, ITALY, & AUSTRIA INCLUDING THE PYRENEES

BY

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LECTURER ON BOTANY AT ST. THOMAS' HOSPITAL

WITH ONE HUNDRED AND TWENTY COLOURED PLATES

IN TWO VOLUMES

VOLUME THE SECOND

LONDON

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THE

FLORA OF THE ALPS

Order XLVII.—COMPOSITÆ.

Inflorescence a capitule surrounded by an involucre of bracts; flowers small, all tubular, or the outer ones (florets of the ray) ligulate, the inner ones (florets of the disk) tubular; all bisexual, or some female, some male or neuter, and some bisexual; calyx-limb 0 or a feathery pappus; stamens 5, anthers always connate (syngenesious); ovary inferior, 1-celled, 1-ovuled, stigmas 2; fruit a 1-seeded achene, often surmounted by the feathery pappus. A vast order, the largest among flowering plants, comprising about one-tenth of the flowering flora of the globe, belonging to all climates and all altitudes. Many of the genera are distinguished only by minute characters, and in some of the genera the species are very difficult, running into one another by insensible gradations.

Sub-Order TUBULIFLORÆ.—Flowers all tubular, or disk-flowers tubular, ray-flowers ligulate; no milky juice.

Tribe EUPATORIEÆ. — Flowers all tubular, bisexual; calyx pappoid; anther-cells not tailed; branches of style

slender, half-teretc, papillose; leaves often opposite. Genera 1–2.

1. EUPATORIUM, L.

Capitules few-flowered, in terminal corymbs; branches of style long, exserted; leaves opposite. Not alpine.

E. cannabinum, L., Hemp-Agrimony; flowers pale purple, heads very large and many-flowered, leaves of 3–5 leaflets; wet places, common.

2. ADENOSTYLES, Cass.

Capitules few-flowered, numerous, in large compound corymbs; flowers pink; involucre usually of a single row of bracts; leaves alternate. Alpine or sub-alpine.

A. albifrons, Rchb. (*albida*, Cass., *Alliaria*, Kern.); capitules 3–6-flowered, stem 1–2 ft., stout, lower leaves reniform-cordate, stalked, upper auricled, all irregularly toothed and tomentose beneath; mountain woods, frequent. *A. alpina*, Bl. (*viridis*, Cass.); corymb less dense, leaves regularly toothed, glabrous or only slightly hairy beneath, upper ones not auricled; moist mountain woods, frequent. *A. leucophylla*, Rchb. (*candidissima*, Cass., *hybrida*, DC.); capitules 10–20-flowered, compact, leaves tomentose on both sides; high; Alps, Southern Switzerland, Piedmont, Dauphiny; less common.

Tribe TUSSILAGINEÆ.—Capitules many-flowered, solitary or corymbose; flowers partially unisexual; branches of style connate in the disk-flowers; leaves alternate. Genera 3–5.

LIX. — HOMOGYNE ALPINA

3. HOMOGYNE, Cass.

Capitule usually solitary, on a nearly leafless scape, appearing before the leaves; involucre usually of one row of bracts; leaves mostly radical, stalked, round. Alpine.

H. alpina, Cass. (Pl. 59); flowers yellowish-red, capitule solitary, stem 6–12 in., woolly, leaves cordate-reniform, crenate, green on both sides; alpine pastures, frequent. *H. discolor*, Cass.; flowers yellow, capitule solitary, stem 3–9 in., woolly, bracts of involucre purple, leaves cordate-reniform, lighter and tomentose beneath; pastures; Tirol, Styria, Carinthia, Carniola. *H. sylvestris*, Cass.; flowers yellow, stem 6–12 in., hairy, with 1–3 capitules, leaves green on both sides, cordate-reniform, coarsely dentate, upper with sheathing leaf-stalk; pastures; Styria, Carinthia, Carniola.

4. TUSSILAGO, L.

Capitule solitary, on a leafless scape; ray-flowers female, disk-flowers male, all yellow; leaves appearing after the flowers. Not alpine.

T. Farfara, L., Colt's-Foot; very common.

5. PETASITES, Tourn.

Capitules numerous, forming a terminal panicle on a leafless scape; flowers purple, red, or white; ray-flowers mostly female, with filiform corolla; leaves very large, appearing after the flowers.

P. officinalis, Mœnch. (*vulgaris*, Desf.) Butter-bur; flowers pink, leaves up to 3 ft. in diam., tomentose or cobwebby beneath; wet places in the lowlands, common.

P. albus, Gærtn.; flowers yellowish-white, often mostly female, leaves roundish-cordate, thinly tomentose beneath; by mountain streams; Switzerland, Jura, Vosges, Dauphiny. *P. niveus*, Baumg.; flowers white or reddish, often chiefly female, leaves cordate-triangular, tomentose and snow-white beneath; by mountain streams, frequent.

Tribe ASTEROIDEÆ.—Ray-flowers female or neuter, ligulate, rarely all tubular, branches of style linear, blunt, glabrous; disk-flowers bisexual, anther-cells not tailed, branches of style linear, glabrous, tipped with a pubescent cone; pappus-hairs rigid or 0; leaves alternate. Genera 6–11.

6. BELLIS, L.

Capitule solitary; disk-flowers yellow, ray-flowers white or pink; involucre campanulate, bracts in 1 or 2 rows, soft, green. Not alpine.

B. perennis, L., Daisy; everywhere.

7. BELLIDIASTRUM, Cass.

Resembling *Bellis*, but achenes crowned by the permanent pappus.

B. Michelii, Cass., Alpine Daisy; resembling *Bellis perennis*, but a larger plant, with more coarsely crenate leaves, and the bracts of the involucre acute; mountain pastures, frequent.

8. ERIGERON, L.

Ray-flowers female, blue or purple, in several rows; disk-flowers bisexual, yellow; bracts in several rows; receptacle flat, pitted; pappus persistent. Mostly alpine.

A. Ray-flowers erect: — *E. acris*, L., Flea-bane; capitules numerous, stem-leaves linear-oblong, half clasping, entire, slightly hairy; dry banks in the lowlands; common. *E. angulosus*, Gaud.; leaves narrower, glabrous, ray-flowers pink or bright red; dry, alpine.

B. Ray-flowers spreading; capitule solitary:—*E. uniflorus*, L.; ray-flowers lilac or white, involucral bracts green, very woolly, radical leaves blunt; alpine pastures. *E. neglectus*, Kern.; ray-flowers peach-coloured, bracts reddish-brown, very woolly, radical leaves short, thick; Alps, Tirol.

C. Ray-flowers spreading; capitules usually numerous: —*E. alpinus*, L.; stem 4–12 in., branched, with from 2 to 5 capitules, covered like the leaves with long hairs, leaves linear-oblong; alpine pastures; Switzerland, Jura, Dauphiny, Pyrenees. *E. Villarsii*, Bell.; stem glandular-hairy, 10–15 in., capitule larger (1 in. diam.), ray-flowers purple; Switzerland, Tirol, Carinthia, Dauphiny. *E. Schleicheri*, Grml.; stem 4–6 in., slightly glandular, capitules smaller, ray-flowers white or light violet; Southern Switzerland, rare (Simplon, Zermatt, Saas). *E. glabratus*, H. and H.; stem 4–6 in., female flowers few or 0, leaves ciliate, stem-leaves nearly glabrous; alpine pastures; local. *E. Prantlii*, Dal. Tor.; female flowers numerous, stem and stem-leaves hairy; Bavaria.

9. SOLIDAGO, L.

Capitules usually in branched scorpioid cymes; flowers all yellow; ray-flowers female; stigmas of disk-flowers tipped with papillose cones. Not alpine.

S. Virgaurea, L., Golden Rod; woods, common. *S.*

alpestris, W. K., and *minuta*, Gaud., are mountain forms.

10. Aster, L.

Disk-flowers bisexual, yellow; ray-flowers ligulate, female, blue or purple; involucral bracts in many rows; receptacle flat, pitted; pappus of many rows of hairs, persistent. Alpine.

Aster alpinus, L. (Pl. 60); stem 2–4 in., capitule large (1½–2 in.), solitary, ray-flowers violet, involucral bracts lanceolate; high; Switzerland, Jura, Dauphiny, frequent. *A. Garibaldii*, Brügg.; capitules 2–7, much smaller, ray-flowers violet; Eastern Alps, rare. *A. Wolfii*, Favr.; stem 8–10 in., capitule large, solitary, ray-flowers blue, involucral bracts linear; rare; Sion. *A. pyrenæus*, DC.; stem 1½–3 ft., pubescent, capitules solitary or 3–5, ray-flowers blue, stem-leaves semi-amplexicaul; Pyrenees. *A. Amellus*, L.; stem 1–1½ ft., pubescent, capitules numerous, corymbose, ray-flowers blue; dry hills; Switzerland, Jura, Dauphiny.

11. Linosyris, DC.

Flowers all tubular and bisexual; receptacle flat, pitted; pappus-hairs in two rows.

L. vulgaris, Cass. (*Chrysocoma Linosyris*, L., *Aster Linosyris*, Bernh.), Goldilocks; capitules small, in dense terminal corymbs, flowers yellow, stem simple, wiry, leafy, leaves linear; open hill-sides, rare; Switzerland, Jura, Dauphiny.

Tribe Inuleæ.—Flowers often unisexual; ray-flowers yellow, ligulate, or 0; disk-flowers tubular, bisexual;

LX.—ASTER ALPINUS.

anther-cells with a slender tail; branches of style and pappus as in the last; leaves alternate. Genera 12–14.

12. INULA, L.

Ray-flowers female or neuter, in one row; capitules solitary or in corymbs; receptacle flat; involucral bracts in many rows. Not alpine.

I. Conyza, DC. (*Conyza squarrosa*, L.), Ploughman's Spikenard; capitules very numerous, involucral bracts brown, plant strongly scented; thickets. *I. spirææfolia*, L.; stem very leafy, leaves coriaceous, ciliate, glabrous; thickets; Southern Switzerland, Dauphiny. *I. hirta*, L.; capitule often solitary, stem and leaves villous, involucral bracts erect; rocky; Southern Switzerland, Jura, rare. *I. salicina*, L.; capitules generally few, upper leaves cordate, amplexicaul, lower linear-oblong, toothed; damp meadows; Southern Switzerland, Jura. *I. Vaillantii*, Vill.; leaves grey-tomentose beneath, stem-leaves lanceolate, narrowed at the base; damp thickets; Western Switzerland, Dauphiny. *I. britannica*, L.; leaves soft, slightly toothed, stem-leaves cordate, amplexicaul, achenes villous; marshy fields; Switzerland, rare. *I. montana*, L.; capitule large, solitary, leaves covered on both sides with long silky hairs, achenes villous; dry; South-Western Switzerland, Dauphiny.

13. PULICARIA, Gaertn.

Resembling *Inula*, but pappus with an outer row of short scales. Not alpine.

The two English species, *P. dysenterica*, Gaertn., woolly, with half-amplexicaul leaves, and ray-flowers

longer than the involucre; common; and *P. vulgaris*, Gaertn., pubescent, ray-flowers erect, as long as involucre; less common; both in wet places.

14. Buphthalmum, L.

Resembling *Inula*, but receptacle covered with scarious scales.

B. salicifolium, L.; flowers yellow, capitules large, solitary, leaves oblong-lanceolate, upper linear-lanceolate, all entire; Southern Switzerland, Jura, Dauphiny, not common. *B. grandiflorum*, L.; capitules larger, bright yellow, leaves longer and narrower; rare.

Tribe Gnaphalieæ.—Resembling *Inuleæ*, but ray-flowers slender, tubular; pappus silky; whole plant soft. Genera 15–19.

15. Gnaphalium, L.

Flowers often unisexual, but monœcious; capitules small, collected into spikes or racemes; ray-flowers very slender, female, in 1 or more rows; disk-flowers bisexual; involucral bracts soft, adpressed, as long as the flowers. Soft woolly herbs.

The three English lowland species of Cud-Weed, *G. luteo-album*, L., with pale yellow flowers; *G. sylvaticum*, L., with the capitules in leafy racemes or spikes, flowers white; and *G. uliginosum*, L., with the capitules in terminal heads, flowers white; occur also in Switzerland; the last in wet, the two others in dry sandy places; the first in Southern and Western Switzerland, the two others everywhere.

The following species are alpine:—

G. supinum, L.; cæspitose, stem very slender, 1–6 in., capitules one or very few, outer involucral bracts more than half as long as the capitule; very high; Switzerland, Jura, Carpathians, Dauphiny, Pyrenees. *G. norvegicum*, Gunn.; stem 6–12 in., capitules in simple spikes, dark brown, outer involucral bracts one-third as long as capitule; very high. *G. Hoppeanum*, Koch; stem 1–6 in., with 1–5 heads, plant very tomentose; very high; Switzerland, Tirol, Carinthia, Salzburg.

16. Filago, L.

Resembling *Gnaphalium;* but the outer flowers of the capitule concealed by the involucral bracts. Small tomentose herbs; not alpine.

The English species, *F. germanica*, L. (including *apiculata*, Sm., *canescens*, Jord., and *spathulata*, Presl.); *minima*, Fr.; and *gallica*, L., in sandy fields; also, in similar situations, *F. arvensis*, L., a more branched plant, with capitules forming a panicle.

17. Antennaria, Gaertn.

Resembling *Gnaphalium*, but usually dicœcious. Alpine or sub-alpine.

A. dioica, Gaertn. (*Gnaphalium dioicum*, L.), Cat's-Foot; heads in simple corymbs, usually pink, stem 2–8 in., stoloniferous; pastures, common. *A. carpathica*, Bl.; flowers white, involucral bracts brown, stem not stoloniferous; high; Alps, Carpathians, Dauphiny, Pyrenees.

18. Leontopodium, Br.

Resembling *Gnaphalium*, but heads surrounded by a whorl of long densely tomentose bracts, expanded like a star.

L. alpinum, Cass. (*Gnaphalium Leontopodium*, Scop.), Edelweiss (Pl. 61). This beautiful and favourite alpine plant occurs in Switzerland, Jura (Dôle), Tirol, Carpathians, Dauphiny, and Pyrenees; but is much more abundant, and grows at a lower elevation, on the Alps south of the Rhone valley, than in Northern Switzerland, where it is largely cultivated by the guides.

19. Micropus, L.

Interior row of involucral bracts concave, forming a cap which envelops the capitules. Not alpine.

M. erectus, L.; stem 4–8 in., whole plant covered by a woolly tomentum; Southern and Western Switzerland, Dauphiny, rare.

Tribe Helianthea.—Ray-flowers ligulate, female or neuter, yellow, or 0; disk-flowers bisexual; leaves alternate or opposite. Genera 20–21.

20. Bidens, L.

Flowers all tubular, or ray-flowers ligulate, neuter; leaves opposite. Not alpine.

The English species, *B. tripartita*, L., capitules erect, leaves usually 3-partite; and *B. cernua*, L., capitules nodding, leaves undivided; in wet places, the former common.

LXI. GNAPHALIUM LEONTOPODIUM.

21. CARPESIUM, L.

Flowers all tubular; leaves alternate. Not alpine.

C. cernuum, L.; stem 4–12 in., leaves soft, pubescent, lanceolate, sinuate-dentate, capitules nodding; damp slopes; Rhone Valley, Geneva, Thun, Constance, Vierwald-statter See, Dauphiny.

Tribe ANTHEMIDEÆ.—Ray-flowers usually ligulate, sometimes very slender and tubular, mostly white; anther-cells not tailed; branches of style linear, with truncate papillose or penicillate tips; pappus 0; leaves alternate. Genera 22–28.

22. ANTHEMIS, L.

Capitule solitary; ray-flowers ligulate, female or neuter, usually white; disk-flowers perfect, yellow, rarely white; branches of style short, with papillose tips; leaves bi-pinnatifid; plant often strongly scented.

A. arvensis, L., Corn-Chamomile; and *Cotula*, L., fœtid, are common weeds in cultivated land; also *A. tinctoria*, L.; ray-flowers yellow; waste places and road-sides in the South. The following are alpine:—*A. montana*, L. (*styriaca*, Vest.); capitule about 1¾ in., disk-flowers yellow, involucral bracts broad, dark brown; Pyrenees, Styria. *A. Triumfetti*, All.; ray-flowers white, linear-oblong, twice as long as involucre, leaf-segments slightly toothed; rare; Ticino (Monte Generoso), Pyrenees. *A. alpina*, L.; capitule about 1 in., ray- and disk-flowers both white, involucral bracts narrow, brownish; Tirol, Styria.

23. Matricaria, L.

Ray-flowers ligulate, white, female, in one row, or 0; disk-flowers bisexual; anther-cells not tailed; receptacle hollow, elongated after flowering; pappus 0. Not alpine.

M. Chamomilla, L., Wild Chamomile, with its peculiar odour; and *M. inodora*, L. (*Pyrethrum inodorum*, Gærtn.), distinguished by its want of scent and its very narrow leaf-segments; are common weeds in cultivated land.

24. Leucanthemum, Tourn.

Ray-flowers ligulate, female, white; disk-flowers tubular, bisexual, yellow; involucre usually flat or concave; involucral bracts with scarious margins; pappus 0 or a membranous wing; fruit of ray-flowers ribbed, of disk-flowers compressed.

L. vulgare, DC. (*Chrysanthemum Leucanthemum*, L.), Ox-eye Daisy; and *L. Parthenium*, G. Gr. (*Matricaria Parthenium*, L.), Feverfew, are common lowland plants. The following are alpine or sub-alpine:—

A. Involucre hemispherical; heads corymbose:—*L. corymbosum*, G. Gr.; leaf-segments in 8–15 pairs, those of the upper leaves linear-lanceolate, inciso-dentate; mountain woods; Western Switzerland, Dauphiny, Pyrenees, not common.

B. Receptacle somewhat concave; capitule solitary; stem nearly leafless:—*L. alpinum*, Lam.; stem 1–3 in., glabrous, upper leaves linear, entire; alpine pastures. *L. minimum*, Vill.; plant small, tomentose, with viscid or rough hairs; rare; Zermatt.

C. Receptacle flat or somewhat concave; stem leafy:— *L. heterophyllum*, DC.; stem-leaves nearly regularly toothed, lower leaves narrowed into a leaf-stalk, border of involucral bracts narrow; Southern Switzerland, Tirol, Carinthia, rare. *L. atratum*, DC.; resembling *vulgare*, but dwarf, achenes of the ray with a membranous crest; alpine pastures, local. *L. Gaudini*, Dal. Tor.; resembling *vulgare*, but lower leaves nearly entire; alpine pastures, frequent. *L. coronopifolium*, Vill.; leaves fleshy, brittle, glabrous, deeply incised, radical leaves elliptical; high; Switzerland, Piedmont, Dauphiny, Pyrences. *L. ceratophylloides*, All.; leaves fleshy, brittle, glabrous, shallowly pinnatifid, radical leaves wedge-shaped; very rare; Switzerland (Linderskopf), Dauphiny. *L. maximum*, DC.; capitule solitary, very large, stem up to 2 ft., ray-achenes more or less crested; pastures; Dauphiny, Pyrenees.

25. Chrysanthemum, L.

Resembling *Leucanthemum*, but ray-flowers yellow; achenes of ray-flowers triquetrous.

C. segetum, L., Corn-Marigold; cultivated fields (not in Switzerland).

26. Achillæa, L.

Capitules small, in dense corymbs; ray-flowers few, ligulate, short, white, yellow, or red; disk-flowers tubular, bisexual; receptacle scaly; pappus 0; leaves very deeply divided; often densely cæspitose. The alpine species appear often to hybridise.

A. Millefolium, L., Milfoil, Yarrow, is very common in grassy places; and *A. Ptarmica*, L., Sneezewort, in damp

meadows. *A. setacea*, W. K., with linear leaf-segments, is a mountain variety of *Millefolium*. The remaining species are alpine.

A. Ray-flowers 6–20 (usually 10), as long as, or longer than, the hemispherical involucre (*Ptarmica*, DC.).

a. Plant very tomentose or silky:—*A. Clavenæ*, L.; leaves silky, elliptic-cuneate in outline, pinnatifid, with elliptic, blunt, entire or 2–3-toothed segments, stem erect, 3–6 in.; alpine pastures, common. *A. nana*, L. (Pl. 62); leaves tomentose, pectinate-pinnatifid, segments linear-lanceolate, often bifid, stem erect, 2–6 in; very high, rare; Switzerland, Tirol, Carinthia, Piedmont, Dauphiny.

b. Plant not tomentose or silky:—*A. alpina*, L.; leaves pinnatifid-dentate; very rare; St. Gothard, Aosta. *A. macrophylla*, L.; corymb very compound, stem 1–1½ ft., leaves large, much divided; moist; Switzerland, Jura, Carinthia, local. *A. glabrata*, Koch; corymbs simple, stem 1–10 in., leaves cuneate-elliptic in outline, pinnate, with blunt segments; high; Carinthia, Salzburg. *A. moschata*, L.; stem about 4 in., leaves pectinate-pinnatifid, with acute entire lobes, dotted; high, frequent. *A. atrata*, L.; stem 3–10 in., leaves pinnatifid, with pinnatifid mucronate segments, involucral bracts with a broad black margin; damp pastures, frequent. *A. Clusiana*, Tausch.; resembling the last, but leaves bipinnate, with acute toothed segments; damp pastures; Styria, Carinthia, Carniola, Salzburg. *A. pyrenaica*, Sibth.; plant pubescent, stem 8–15 in., leaves pale green, strongly dotted, lanceolate, attenuate, dentate; Pyrenees. *A. herba-rota*, All., stem 6–8 in., leaves pale green, strongly dotted, stem-leaves simple, oblong-cuneate, dentate, plant aromatic; Dauphiny, Pyrenees.

ACHILLEA NANA

B. Ray-flowers 3–7, not so long as the flat involucre: —*A. tanacetifolia*, All. (including *stricta*, Schleich., *distans*, W. K., and *dentifera*, DC.); flowers very often pink, leaves pinnate or pinnatifid, rachis of middle leaves winged and toothed; high, frequent. *A. nobilis*, L.; flowers white, leaves oblong-oval in outline, rachis not winged; Switzerland, rare (Bâle, Bienne, Neuchâtel), Dauphiny. *A. magna*, Hænk.; flowers often red, leaves very finely ter-pinnatifid, involucral bracts with a broad black-brown margin; alpine pastures, Switzerland, Dauphiny, local.

A. tomentosa, L.; ray-flowers yellow, leaves woolly; Southern Switzerland, Savoy, is not alpine.

27. Tanacetum, L.

Flowers all tubular, yellow; involucral bracts in many rows; outer flowers female, inner male; anther-cells not tailed; pappus 0; strongly scented. Not alpine.

T. vulgare, L., Tansy; dry places, frequent.

28. Artemisia, L.

Capitules small, few-flowered, in racemes or panicles; involucral bracts in few rows, with scarious margins; flowers all tubular, outer female, inner male or bisexual; pappus 0; bitter aromatic herbs or small shrubs.

A. vulgaris, L., Mugwort; flowers all perfect, and leaves woolly only beneath, is very common by road-sides; and *A. Absinthium*, Wormwood; outer flowers only fertile, leaves silky on both sides, not unfrequent in stony places. The following species are alpine:—

A. Capitules globular; receptacle hairy:—*A. Mutellina*, Vill.; capitules 12–15-flowered, yellowish, in spikes

or racemes, the lowermost on long stalks, stem 3–6 in., leaves triply 3-partite, with silky adpressed hairs; frequent. *A. glacialis*, L.; capitules 30–40-flowered, corymbose, sessile, golden-yellow; very high, rare; Switzerland (Zermatt, Simplon), Dauphiny, Pyrenees, Piedmont. *A. nitida*, Bert. (*lanata*, Koch, *pedemontana*, Balb.); stem 6–12 in., capitules nodding, forming a long leafy raceme, leaves covered with a white wool; Southern Tirol, Piedmont, Lombardy, rare.

B. Capitules nearly globular; receptacle glabrous; disk-flowers bisexual and fertile:—*A. spicata*, Wulf.; cæspitose, tomentose, stem 3–6 in., ending in a simple raceme, stem-leaves inciso-serrate; very high, rare; Alps, Carpathians, Dauphiny, Pyrenees. *A. tanacetifolia*, All.; capitules glabrous, nodding, stem 6–18 in., often branched below, leaf-segments mucronate; Carniola, rare. *A. nana*, Gaud.; stem 4–6 in., generally simple, capitules small, unilateral, leaf-segments narrowly lanceolate; rare, Valais, Tirol, Dauphiny. *A. norica*, Leyb.; capitules large, not unilateral, spike leafy, leaves auricled at the base, leaf-segments broadly lanceolate; Tirol, very high, rare (Gross-Glockner, Gross-Venediger). *A. pontica*, L.; stem 1½–2 ft., branched, capitules grey, tomentose, forming a panicle; Styria. *A. insipida*, Vill.; stem 12–16 in., silky-white, capitules unilateral, panicled, leaves bipinnate, with linear segments, mucronate; high, Dauphiny. *A. Villarsii*, G. and G.; cæspitose, stem 4–12 in., silky-white, capitules nodding, corolla hairy, leaves silky-white; high; Dauphiny, Pyrenees. *A. atrata*, Lam.; stem 8–12 in., leaves glabrous, stalked, dotted, corolla velvety; Dauphiny, Piedmont, Carniola. *A. chamæmelifolia*, Vill.; aromatic, stem 12–30 in., corolla glabrous, leaves

glabrous, not dotted, stem-leaves sessile, amplexicaul; Dauphiny, Piedmont.

C. Capitules ovate; receptacle glabrous; disk-flowers hermaphrodite and sterile; not alpine:—*A. campestris*, L.; capitules in long slender racemes, yellow, drooping, leaves pinnatifid; sandy places. *A. valesiaca*, All.; leaves tomentose, snow-white, pinnate, with narrow linear segments; Southern Switzerland.

Tribe SENECIONEÆ.—Flowers usually all bisexual and ligulate, generally yellow; receptacle naked; anther-cells not tailed; branches of style free in the disk-flowers; pappus-hairs usually very soft; leaves alternate. Genera 29–32.

29. SENECIO, L.

Capitules solitary or in corymbs; ray-flowers female or 0; branches of style with penicillate tips; pappus-hairs soft, slender, deciduous; involucral bracts in one row, sometimes with a short outer involucre.

The following English lowland species are found also in Switzerland, &c.:—*S. vulgaris*, L., Groundsel; *sylvaticus*, L., a somewhat larger fœtid plant; *Jacobæa*, L., Ragwort; *viscosus*, L., a viscid plant with broad leaves; *erucifolius*, L., pubescent, with simply pinnatifid leaves; *aquaticus*, Huds. (including *barbareæfolius*, Krock.); and *paludosus*, L., both in wet places, the former with divided, the latter with undivided cottony leaves. The remaining species are mostly alpine.

A. Capitule with an outer involucre of small bracts; leaves simply or doubly pinnatifid:—*S. abrotanifolius*, L.; flowers orange-yellow, leaves bi-pinnate (upper simply

pinnate), with linear segments, glabrous; high; Eastern Switzerland, Carpathians. *S. tiroliensis*, Kern.; resembling the last, but stem thickened beneath the capitule, leaf-segments shorter and stiffer; Tirol. *S. nebrodensis*, L.; leaves woolly when young, leaf-rachis toothed, involucral bracts long, black-tipped, ray-flowers often 0; Engadine, Styria. *S. adonidifolius*, Lois.; leaf-segments linear, leaf-stalk somewhat winged; Jura, Dauphiny, Pyrenees. *S. uniflorus*, All.; cæspitose, stem 1–4 in., capitule large, solitary, leaves white, very tomentose, fruit hairy; rare; Zermatt, Simplon, Southern Tirol, Piedmont. *S. incanus*, L.; capitules several, small, fruit glabrous or slightly pubescent at the tip, stem 2–4 in., leaves pectinate-pinnate, covered with a white woolly tomentum; rare; Switzerland, Mont Cenis, Tirol, Piedmont, Dauphiny. *S. carniolicus*, Willd.; resembling the last, but leaves less divided, grey with adpressed silky hairs; Southern Switzerland, Tirol, Carniola, Carinthia, Styria.

B. Capitule with an outer involucre of small bracts; lower leaves simple:—*S. Doronicum*, L.; flowers orange-yellow, stem 8–18 in., capitules large, usually 1–3, lower leaves elliptic, upper oblong, dentate; not common. *S. Cacaliaster*, Lam.; flowers pale yellow, ray-flowers 0, leaves lanceolate, serrate, upper half-amplexicaul; moist, rare; Southern Tirol, Carinthia, Tirol, Styria. *S. sarracenicus*, L. (*Fuchsii*, Gmel.); involucre shortly cylindrical, leaves nearly glabrous, upper ones with a narrowly winged leaf-stalk, not amplexicaul; mountain woods. *S. nemorensis*, L. (*Jacquinianus*, Rchb.); involucre campanulate-cylindrical, leaves hairy beneath, half-amplexicaul; mountain woods. *S. Doria*, L.; capitules small, numerous, lower leaves large, attenuated into a winged

petiole, upper amplexicaul, decurrent, crenulate; pastures; Carinthia, Pyrenees. *S. cordifolius*, Gou. (including *auriculatus*, Jacq., and *subalpinus*, Koch); capitules large, lower leaves cordate-ovate, serrate, webbed, with auricled leaf-stalk, uppermost pinnatifid; Switzerland, Bavaria, Tirol, Styria, generally near châlets.

C. Capitules without an outer involucre (*Cineraria*, L.):—*S. crispus*, Jacq.; leaves coarsely notched and unequally dentate, often curled, with broadly winged entire or dentate leaf-stalk; damp pastures. *S. spathulæfolius*, DC.; leaves nearly entire, white beneath, radical leaves on very long stalks, often nearly linear, achene covered with short stiff hairs; mountain swamps. *S. longifolius*, Jacq.; resembling the last, but ovary and achene downy; Tirol. *S. pyrenaicus*, G. and G.; leaves oblong or elliptic, attenuated into a leaf-stalk, floccose beneath; Pyrenees. *S. Clusianus*, Jacq.; radical leaves on short stalks, very woolly, ovary and achene glabrous; Austrian Alps, rare. *S. alpestris*, DC.; radical leaves and lower stem-leaves on very long stalks, woolly; pastures; Tirol, Carniola. *S. leiocarpus*, Koch; resembling *alpestris*, but leaves webbed on the upper, covered with a dense white wool on the under side; Austrian Alps. *S. croceus*, Koch (*Cineraria crispa*, Jacq., var.); flowers saffron-yellow, involucral bracts purple-brown, leaves with long winged leaf-stalks, ovary glabrous; pastures. *S. aurantiacus*, DC.; flowers orange-yellow, involucral bracts reddish-brown, leaves shortly stalked, woolly; moist pastures; Switzerland, Dauphiny, *S. campestris*, DC. (*Cineraria alpina*, Huds.); flowers yellow, radical leaves narrowed into a winged leaf-stalk, involucral bracts green; Jura, Pyrenees, Tirol, rare.

30. Doronicum, L.

Resembling *Senecio*, but involucral bracts in several rows; ray-flowers usually female; stem-leaves amplexicaul; pappus-hairs rigid. Alpine.

D. austriacum, Jacq.; flowers golden-yellow, stem 2–3 ft., radical leaves cordate, obtuse, stem-leaves auriculate, receptacle pubescent; mountain-woods; Bavaria, Tirol, Styria, Carniola, Jura, Pyrenees, Puy-de-Dôme. *D. Pardalianches*, L., Leopard's-Bane; capitules numerous, umbellate, radical leaves cordate-ovate, stalk of stem-leaves sheathing, root-stock tuberous; mountain-woods, local. *D. Matthioli*, Tausch.; capitules fewer, on elongated stalks; Switzerland, Austrian Alps, local. *D. cordatum*, Kern. (*Columnæ*, Ten.); stem 1½–3 ft., leaves glabrous, lower cordate-ovate; Tirol, Styria, Carpathians, Salzburg.

31. Aronicum, Neck.

Resembling *Doronicum*, but achenes of both ray- and disk-flowers crested. Alpine.

A. glaciale, Rchb.; capitule large, solitary, leaves thick, stiff, ovate-lanceolate, sinuate-dentate; very high, near glaciers. *A. Doronicum*, Jacq. (*Clusii*, Koch, *hirsutum*, Lam.); leaves entire or distantly toothed, soft, stem and leaves hairy; Alps, Dauphiny, Carpathians. *A. Bauhini*, Saut.; leaves inciso-dentate, stem and leaves covered with rough hairs; Tirol, rare. *A. scorpioides*, Rchb. (*grandiflorum*, Lam.); stem 9–18 in., capitules 1–4, radical leaves cordate-ovate, on long stalks, coarsely dentate, stem-leaves not auricled, plant fœtid; high; Switzerland, Jura, Austrian Alps, Dauphiny, Pyrenees. *A.*

Jacquini, Tausch.; leaves serrate-dentate, lower and middle stem-leaves auricled; Carinthia, Styria, local.

32. ARNICA, L.

Achenes of ray- and disk-flowers crested; stem-leaves opposite, entire. Alpine.

A. montana, L. (Pl. 63); stem 1–2 ft., capitules 1–3, large (2½–3 in.), flowers orange-yellow, leaves nearly entire, stem and leaves downy; alpine pastures, frequent.

Tribe CYNAREÆ.—Involucre usually globular, with hard or spiny bracts; flowers all tubular, bisexual, or the outer ones female or neuter; cowlla-tube bulbous in the upper part; leaves alternate, often spiny. Genera 33–47.

33. JURINEA, Cass.

Flowers all bisexual; involucral bracts usually unarmed; anther-cells with two filiform appendages; pappus deciduous, composed of several rows of toothed hairs.

J. mollis, Rchb. (*pyrenaica*, G. and G.); capitule solitary, flowers purple, involucral bracts erect, leaves pinnatifid, somewhat tomentose; Styria, Carniola, Pyrenees (Vallée d'Eynes).

34. BERARDIA, Vill.

Flowers all bisexual; involucral bracts unarmed; anther-cells with two filiform appendages; receptacle pitted; pappus persistent, composed of several rows of toothed hairs twisted spirally.

B. subacaulis, Vill.; capitule large, solitary, flowers

white, leaves coriaceous, tomentose, nearly entire, stem 2–6 in.; high; Dauphiny.

35. Saussurea, DC.

Flowers purple or violet; capitules usually numerous, corymbose; involucral bracts unarmed; anther-cells tailed; pappus-hairs in two rows, the outer rough, the inner feathery. Alpine.

S. alpina, DC.; stem 6–18 in., leaves lanceolate, webbed beneath with grey hairs, involucral bracts narrow; high, rocky. *S. macrophylla*, Saut.; leaves broader, involucral bracts broad; Tirol, Salzburg, Pyrenees, rare. *S. depressa*, Gren.; capitules few, stem very short (2 in.), leafy, leaves grey-white beneath; very rare; Southern Switzerland, Tirol (Gross-Glockner), Dauphiny. *S. discolor*, DC.; leaves lanceolate-cordate, with a snow-white tomentum beneath; high, rare. *S. pygmæa*, Spreng.; flowers red-violet, capitule solitary, stem 2–6 in., leaves linear, entire or denticulate; Tirol, Carniola, Carinthia, Styria, rare.

36. Carlina, L.

Flowers purple; outer involucral bracts spiny, spreading, white, inner coloured, shining; fruit silky, with feathery pappus; leaves pinnatifid, spiny.

The English *C. vulgaris*, L., Carline-Thistle, with single sessile white capitule; very common on open hill-sides. Also *C. acaulis*, L.; capitule solitary, much larger (up to 3 in.), stem 0 or very short; mountain pastures, frequent, especially in Jura. *C. longifolia*, Rchb. (*nebrodensis*, Koch); stem up to 18 in., capitules several, leaves elliptic-

lanceolate; Switzerland, Tirol, Vosges, Jura, Salzburg, rare. *C. acanthifolia*, All.; nearly stemless, capitule solitary, very large, leaves tomentose beneath, very spiny; Dauphiny, Pyrenees.

37. Arctium, L.

Capitules globose; involucral bracts with long spreading stiff hooked tips; leaves very large, simple. Not alpine.

A. majus, Schk. (*Lappa major*, Gærtn., *L. officinalis*, All.), Greater Burdock; and *A. minus*, Schk. (*Lappa minor*, DC.), Smaller Burdock; very common. *A. tomentosum*, Schk.; capitules strongly webbed, smaller and more numerous; at higher elevations. *A. nemorosum*, Lge. (*intermedium*, Rchb.); capitules webbed, lower leaves coarsely toothed; woods.

38. Xeranthemum, Tourn.

Flowers purple, outer sterile, with a bi-labiate corolla; involucral scales unarmed; stamens with completely free filaments. Not alpine.

X. inapertum, Willd. (*erectum*, Pr.); inner involucral bracts expanded only in the sunshine, leaves tomentose; dry; Southern Switzerland.

39. Serratula, DC.

Flowers purple or white; capitules solitary or numerous; involucral bracts unarmed; anther-cells not tailed; pappus-hairs rigid.

A. Involucral bracts lacerated, or with a broad membranous appendage; leaves tomentose (*Rhaponticum*, DC.):—*S. Rhaponticum*, DC. (*R. scariosum*, Lam.); capitule large, solitary, appendages of bracts ciliate, stem 1½–2 ft., leafy below, naked above; Valais, Dauphiny, rare. *S. heleniifolia*, G. and G.; capitules solitary or several, stem 3–4 ft., leafy throughout, involucral appendages not ciliate, stem-leaves often lyrate; high, local. *S. cynaroides*, DC.; capitules very large, usually solitary, involucral scales lacerated, stem about 3 ft., leafy; Pyrenees.

B. Involucral leaves not appendaged; leaves nearly glabrous:—*S. tinctoria*, L., Saw-Wort; capitules small, numerous, oval, often unisexual, involucral bracts rigid, strongly ciliate, stem-leaves usually lyrate-pinnatifid; thickets, frequent. *S. Vulpii*, Fisch., *alpina* (var.), G. and G.; and *monticola*, Bor., are mountain forms of *tinctoria*, often with only a single capitule. *S. nudicaulis*, DC.; capitule large (up to 1 in.), solitary, bisexual, upper part of stem leafless, radical and uppermost leaves entire, intermediate serrate; Salève, Piedmont, Dauphiny. *S. heterophylla*, Desf.; resembling the last, but stem leafy throughout, lower stem-leaves pinnatifid at the base; Dauphiny.

40. CRUPINA, Cass.

Resembling *Serratula*, but outer flowers of capitule sterile; inner row of pappus-hairs reduced to scales. Not alpine.

C. vulgaris, Cass.; flowers 3–5 in a capitule, purple, stem-leaves pinnatifid, with linear toothed segments, stony places; Western Switzerland.

41. ECHINOPS, L.

Flowers all bisexual; capitules 1-flowered, united into a globular head with a common receptacle; involucral bracts hard, keeled, shining. Not alpine.

E. sphærocephalus, L.; flowers pale blue, stem 3–5 ft., with a single globular head, or several; road-sides; Western Switzerland, Dauphiny, occasional.

42. SILYBUM, Gærtn.

Flowers bisexual; outer involucral bracts spiny; pappus deciduous, formed of several rows of denticulate hairs; filaments connate into a sheath. Not alpine.

S. Marianum, Gærtn., Milk-Thistle; involucral bracts reflexed, leaves very large, spiny, spotted with white; waste places; Valais, but often introduced.

43. ONOPORDON, L.

Flowers bisexual, purple; capitules very large; involucral bracts spiny, webbed; anther-cells tailed; pappus composed of ciliate hairs, deciduous. Not alpine.

O. Acanthium, L., Cotton-Thistle; stem strongly winged, leaves large, very spiny; waste places.

44. CIRSIUM, Tourn. (*Cnicus*, L.).

Flowers bisexual, usually purple; capitule usually globular, involucral scales very stiff, acuminate or spiny; receptacle covered with bristles; pappus feathery; leaves spiny. The species appear to hybridise freely.

Several very common species of Thistle belong to this genus, viz.:—*C. lanceolatum*, Scop., Spear-Thistle, and

arvense, Scop., in meadows; *C. palustre*, Scop., and *pratense*, Willd. (*anglicum*, Lam.), in damp fields.

The following are less common or are not English:—

A. Flowers yellow:—*C. oleraceum*, Scop.; whole plant soft and succulent, involucral bracts ending in a short spine, leaves pale green, ciliate-spiny, upper part of stem very leafy; wet meadows, common. *C. spinosissimum*, Scop.; involucral bracts ending in a long strong spine, capitules surrounded by yellowish-white lanceolate spiny pinnatifid leaves; alpine pastures, frequent. *C. Erisithales*, Scop.; capitules nodding, involucre viscid, not surrounded by spiny leaves, stem nearly leafless above; pastures; Switzerland, Jura, Dauphiny. *C. carniolicum*, Scop.; involucre not viscid, not surrounded by spiny leaves, stem and stalk of capitule rusty-tomentose; Southern Tirol. *C. glabrum*, DC.; flowers pale yellow, involucre very spiny, surrounded by linear-lanceolate dentate spiny leaves, leaves linear-lanceolate, pinnatifid, coriaceous; Pyrenees.

B. Flowers purple; leaves with rough spines on the upper surface:—*C. eriophorum*, Scop.; capitule very large, webbed, leaves not decurrent; subalpine pastures. *C. spathulatum*, Gaud.; resembling the last, but involucre less strongly webbed, bracts spathulate-concave, with pectinate-ciliate appendages; Ticino.

C. Flowers purple; leaves not spiny above:—*C. acaule*, Scop.; plant nearly or quite stemless, capitule solitary, sessile; pastures, frequent. *C. pauciflorum*, Spreng.; leaves very large, all undivided, stem-leaves amplexicaul, lowermost somewhat webbed; pastures; Styria, Carniola, local. *C. tuberosum*, All.; leaves deeply pinnatifid, root tuberous; Western Switzerland. *C. heterophyllum*,

All.; leaves entire or pinnatifid, very soft, white-tomentose beneath, stem 2–3 ft., cottony; pastures, frequent. *C. rivulare*, Link; capitules 2–4, large (up to ¾ in.), on long stalks, lower leaves usually undivided, stem nearly leafless above; damp pastures, frequent. *C. montanum*, Spreng.; stem leafy up to the summit, leaves deeply pinnatifid; Southern Tirol, rare. *C. bulbosum*, DC.; capitules few, on long stalks, leaves somewhat tomentose beneath, root-fibres bulbous; Jura, Dauphiny, Geneva. *C. monspessulanum*, All.; capitules small, corymbose, stem pubescent, winged, branched, involucre not webbed, bracts with black spots; Carniola, Styria, Dauphiny, Pyrenees.

45. Carduus, L.

Resembling *Cirsium*, but pappus-hairs rough and stiff, united, deciduous.

C. nutans, L., with large nodding heads; *crispus*, L., with much smaller erect heads and continuous wing to the stem; and *acanthoides*, L., like the last, but with fewer and larger heads and spiny bracts, are common English thistles.

The following are mostly not British :—

A. Capitules oblong or ovoid-oblong, deciduous when mature :—*C. pycnocephalus*, L.; capitules small, in clusters, wing of stem continuous; Geneva, Pyrenees, rare. *C. tenuiflorus*, Curt.; resembling the last, and scarcely distinguishable, capitules more numerous and smaller, wing of stem broader; Geneva, Pyrenees.

B. Capitules globose or ovoid, not deciduous :—*C. platylepis*, Saut.; capitule large, solitary, erect, involucral bracts recurved, spiny; meadows, occasional. *C.*

carduelis, L. (*arctioides*, Willd., *alpestris*, W. K.); capitule solitary, terminal, leaves pinnatifid, glabrous; moist pastures, occasional. *C. defloratus*, L. (including *glaucus*, Baumg., *viridis*, Kern., *rhœticus*, DC., and *carlinæfolius*, Gaud.); branches ending in a long leafless peduncle bearing a single capitule, stem winged, leaves more or less sinuate-dentate and spiny, usually glabrous beneath; very variable; pastures. *C. Personata*, Jacq.; capitules numerous, racemose, branches leafy to the summit, upper leaves with long spines, lower deeply pinnatifid; pastures, frequent. *C. agrestis*, Kern.; resembling the last, but capitules less numerous, lower leaves sinuate-pinnatifid; Tirol, rare. *C. nigrescens*, Vill.; peduncles white-tomentose, leafy to the summit; Dauphiny. *C. hamulosus*, Ehrh.; stalk of capitule tomentose, leafless; Carniola, Dauphiny, Cevennes. *C. aurosicus*, Vill.; capitules corymbose, on short stalks, involucral bracts strongly spined; very rare; Mont Auronse, Dauphiny.

46. KENTROPHYLLUM, Neck.

Outer involucral bracts foliaceous, pinnate, spiny; pappus of ray-flowers 0, of disk-flowers composed of dentate scale-like hairs. Not alpine.

K. lanatum, DC. (*Carthamus lanatus*, L.); flowers yellow, capitule solitary, stem leafy, woolly above, leaves sinuate-pinnatifid; dry, stony; Canton de Vaud, Valais, Geneva, Pyrenees.

47. CENTAUREA, L.

Involucral bracts adpressed, scarious, fringed, or spiny; receptacle bristly; flowers all tubular, outer ones usually

larger, neuter, inner bisexual; pappus-hairs short, scabrid, rarely 0.

A. Flowers blue:—*C. Cyanus*, L., Cornflower, Bluebottle; cornfields. *C. montana*, L., commonly sold as Cornflower; leaves green, entire, slightly webbed, involucral bracts with a narrow black fringe, capitule solitary; bushy, alpine, common. *C. axillaris*, Willd.; capitules often several, leaves white, webbed, involucral bracts with a broad silvery fringe; bushy, alpine; Southern Switzerland, Dauphiny.

B. Flowers yellow:—*C. solstitialis*, L.; involucre spiny, stem winged, cottony, lower leaves lyrate, upper linear, decurrent; cultivated land.

C. Flowers red, involucre spiny:—*C. Calcitrapa*, L.; stem-leaves pinnatifid, not decurrent.

D. Flowers red, involucre not spiny; bracts dentate-fringed, but not appendaged:—*C. Scabiosa*, L., with pinnatifid leaves and broadly-rayed capitules, is common in English meadows; the others are not British. *C. valesiaca*, Jord.; involucral bracts strongly veined, lateral fringes 5–7 on each side; waste places; Valais. *C. paniculata*, L.; involucral bracts with a spiny terminal fringe; very rare; Valais, Bâle, Nyon. *C. maculosa*, Lam.; involucral bracts with a black spot at the tip, lateral fringes 7–12 on each side; Lower Engadine, Chur, Bâle, Dauphiny. *C. alpestris*, Heg. (*Kotschyana*, Koch, *Menteyerica*, Chaix); fringe almost silvery, more or less hiding the involucre, capitules very large (¾–1 in.); mountain pastures, local; Southern Switzerland, Dauphiny. *C. leucophæa*, Jord.; capitules forming an elongated panicle, outer flowers rayed, leaves very pale green; Dauphiny, Pyrenees.

E. Flowers red; involucre not spiny; bracts appen-

daged:—*C. nigra*, L., Knapweed, Hardhead, is a very common plant in English meadows. The following lowland species are very nearly allied:—*C. nigrescens*, Willd.; glabrous, involucre cylindrical, appendages with recurved tip, pappus 0. *C. transalpina*, Schleich.; similar, but plant covered with rough hairs, involucre variegated with black and green. *C. pratensis*, Thuill.; marginal flowers barren, appendages lighter, pappus 0. *C. uniflora*, L.; capitule large, solitary, stem quite simple, very leafy, 4–15 in., leaves cottony on both sides, lower ones with a long winged stalk; High Alps, Dauphiny. *C. nervosa*, Willd. (*plumosa*, Lam., *Thomasiana*, Grml., *Ferdinandi*, Gren.); leaves grey-green, auricled; High Alps, Southern Switzerland, Tirol, Carniola, Dauphiny. The remaining species are lowland or sub-alpine:—*C. alba*, L. (*splendens*, Gaud.); leaves pinnate or bi-pinnate, with linear segments, appendages of involucre white; Ticino. *C. Jacea*, L. (including *amara*, L.); very nearly allied to *nigra*, but involucral appendages undivided, finely denticulate or lacerated, pappus 0; frequent. *C. rhætica*, Mor. (*austriaca*, Koch, *cirrhata*, Rchb.); involucre elliptical, appendages long, pointed, pinnatifid, not concealing the involucre, stem and leaves usually glabrous; Southern Switzerland, Tirol, Styria, Piedmont. *C. phrygia*, L. (*austriaca*, Willd.) (Pl. 64); stem 1½–3 feet, branched, ray-flowers very slender, appendages brown, leaves broadly lanceolate, dentate; sub-alpine pastures, frequent. *C. pseudo-phrygia*, Mey.; resembling the last, but appendages black-brown; pastures; Switzerland, Tirol.

Sub-Order LIGULIFLORÆ.—Plants with a milky juice (latex); flowers all ligulate.

LXIV.—CENTAUREA THRYGIA.

Tribe CICHORIACEÆ. — Style cylindrical, pubescent above, branches of style linear, pubescent at the back. Genera 48–68.

48. CICHORIUM, L.

Flowers blue; involucral bracts in two rows; anther-cells not tailed; pappus scaly. Not alpine.

C. Intybus, L., Chicory; road-sides, common.

49. ARNOSERIS, Gærtn.

Flowers yellow; capitules small, few, on leafless scapes; pappus 0; fruit crowned by a coriaceous ring. Not alpine.

A. pusilla, Gærtn.; leaves 2–4 in. long, narrowly ob-ovate, toothed, scape greatly thickened below the capitule; sandy fields, rare; Switzerland, Lombardy.

50. LAPSANA,* L.

Flowers yellow; capitules very small, numerous; involucral bracts in one row, erect; receptacle flat; anther-cells not tailed; pappus 0.

L. communis, L., Nipple-Wort; stem leafy, lower leaves lyrate, pinnatifid, upper entire. Waste ground, common.

51. APOSERIS, Neck.

Flowers yellow; capitule large, solitary, on a leafless scape; involucral bracts in one row, with an outer row of small scales; pappus 0.

A. fœtida, Less.; fœtid, leaves all radical, runcinate-

* Continental botanists spell this word *Lampsana*.

pinnatifid; flowers sulphur-yellow; pastures; Western Switzerland, Savoy, Dauphiny, Pyrenees.

52. Leontodon, L.

Flowers yellow; capitules on simple or branched leafless scapes; involucral bracts in several rows; receptacle naked; pappus (at least partially) feathery.

Three species of Hawkbit are English, in meadows and on dry banks, viz.:—*L. autumnalis*, leaves glabrous, lanceolate, pappus of all the flowers feathery; *L. hispidus*, L. (*Apargia hispida*, Willd.), leaves oblong-lanceolate, hispid, pappus of all the flowers in two rows, outer scabrid, inner feathery; and *L. hirtus*, L. (*Thrincia hirta*, Roth.), leaves oblong, hispid, pappus of inner flowers feathery, of outer composed of toothed scales.

The following are alpine or sub-alpine:—*L. incanus*, Schrk.; capitule nodding in bud, pappus-hairs all feathery, stem, leaves, and involucre hoary with a grey pubescence; Eastern and Southern Switzerland, Tirol, Dauphiny, Lombardy. *L. saxatilis*, All.; involucre with black woolly hairs, pappus snow-white; Switzerland. *L. Taraxaci*, L.; corolla of outermost flowers streaked with red beneath, pappus-hairs feathery, brown, involucre densely covered with dark brown hairs; high, frequent. *L. pyrenaicus*, Gou.; upper part of stem with a few scales, leaf-stalk narrow, leaves often pinnatifid, flowers often orange; high, frequent. *L. hastilis*, L.; leaves lanceolate, dentate or sinuate-dentate, very variable; frequent. *L. crispus*, Vill.; leaves sinuate-dentate or pinnatifid, hispid; Ticino, Southern Tirol. *L. tenuiflorus*, Rchb.; leaves sinuate-dentate with distant teeth, outer row of

pappus-hairs short, rough; Ticino, Lombardy. *L. alpinus*, Vill.; corolla red on the under-side, leaves all radical, dentate, not pinnatifid; very high; Dauphiny.

53. HYPOCHÆRIS, L.

Flowers yellow; capitules on simple or branched leafless scapes; pappus of one row of feathery hairs and usually an outer row of short stiff bristles; receptacle scaly.

H. glabra, L., with toothed or sinuate, and *radicata*, L., with runcinate-pinnatifid leaves, are common meadow plants. *H. maculata*, L.; capitules large, 1–3, stem thickened towards the top, involucral bracts entire, leaves usually spotted with dark brown; high alpine pastures. *H. uniflora*, Vill.; capitule very large, solitary, with greatly thickened stalk, involucral bracts fringed, woolly; very high; Switzerland, Carniola, Dauphiny, Carpathians.

54. TARAXACUM, Juss.

Flowers yellow; capitule solitary, on a leafless hollow scape; involucral bracts in several rows, the outer ones often recurved; receptacle naked, pitted; pappus-hairs in several rows; fruit ribbed and beaked.

T. officinale, Web., Dandelion; everywhere. *T. palustre*, DC.; differing in its erect outer involucral scales; wet places, common. *T. lævigatum*, DC.; with smaller and paler capitules and more divided leaves; dry pastures, local. *T. nigricans*, Kit.; flowers golden-yellow, outer involucral bracts spreading, stalk of pappus much longer than the fruit; alpine pastures, local. *T. Pacheri*, Schultz;

flowers golden-yellow, whitish beneath, outer involucral bracts erect, ripe fruit as long as stalk of pappus; Carinthia, very rare.

55. Willemetia, Neck.

Flowers yellow; capitules usually several; involucral bracts in one row with an outer row of scales; receptacle naked; fruit beaked, toothed, teeth forming a terminal crest; pappus-hairs feathery, simple, white.

W. hieracioides, Monn. (*stipitata*, Jacq., *apargioides*, Willd.); stem angular, stem and involucre rough with dark brown hairs, leaves obovate, sinuate-dentate; pastures, frequent.

56. Picris, L.

Flowers yellow; stem branched, leafy, hairy; capitules usually numerous, corymbose; involucral bracts in several rows, the outer ones spreading; fruit curved; pappus-hairs in two rows, feathery.

P. hieracioides, L. (*crepoides*, Saut.); very hispid, stem-leaves half-amplexicaul; common. *P. pyrenaica*, L.; capitules larger, leaves covered with long soft hairs; Jura, Dauphiny, Vosges, Pyrenees, local.

57. Helminthia, Juss.

Resembling *Picris*, but outer involucral bracts cordate; fruit beaked.

H. echioides, Gærtn.; very hispid, capitules large (1 in.), lower leaves sinuate-dentate, upper amplexicaul; cultivated land; Jura, Styria, Dauphiny, local.

58. Tragopogon, L.

Flowers yellow or purple; capitule large, solitary; involucral bracts in one row, narrow, usually longer than the flowers; leaves entire, amplexicaul; fruit with a long beak; pappus-hairs in several rows, rigid, feathery. Very milky plants; flowers always closing by mid-day.

A. Flowers yellow:—*T. pratensis*, L. (including *orientalis*, L.), Goat's-Beard; involucral bracts not longer than the flowers, stem not much thickened below the capitule; meadows, common. *T. dubius*, Vill.; involucral bracts twice as long as the flowers, stem of capitule not much thickened, leaves narrower; road-sides, local. *T. major*, Jacq.; involucral bracts longer than the flowers, stem greatly thickened below the capitule; road-sides; Switzerland, Dauphiny.

B. Outer flowers purple, inner yellow:—*T. crocifolius*, L.; involucral bracts 5–8, longer than the flowers, leaves linear; very rare; Great St. Bernard, Dauphiny.

59. Scorzonera, L.

Flowers yellow, purple, or pink; capitules one or more; involucral bracts in several rows; leaves entire; fruit elongated, not beaked; pappus feathery. Alpine.

A. Flowers yellow:—*S. austriaca*, Willd.; capitule solitary, stem 4–15 in., with a few scale-like leaves, root-leaves broadly oval, glabrous; Southern Switzerland, Jura, Savoy, Tirol, Styria, Dauphiny. *S. humilis*, L.; stem bearing 1–3 capitules, with a few small leaves, woolly, involucre more or less woolly at the base; Southern Switzerland, Jura, Pyrenees. *S. hispanica*, L.,

Salsify; stem bearing several capitules, leafy below, 1½–3 ft.; rare; Aostathal, Dauphiny (but often cultivated). *S. aristata*, Ram.; capitule solitary, stem leafless, stem 8–16 in.; Tirol, Carinthia, Carniola, Salzburg, Pyrenees.

B. Flowers pink:—*S. rosea*, W. and K.; leaves linear-lanceolate; rare; Tirol, Carniola, Carinthia, Carpathians.

60. Podospermum, DC.

Resembling *Scorzonera;* but achenes swollen, prolonged at the base into a stalk; leaves pinnatifid. Not alpine.

P. laciniatum, DC.; flowers pale yellow, stem erect, simple, capitule solitary, leaf-segments distant, usually linear; road-sides; Valais, Dauphiny, Pyrenees. *P. calcitrapæfolium*, DC. (*decumbens*, G. and G.); stems often decumbent; Dauphiny.

61. Sonchus, L.

Flowers yellow; capitules numerous, corymbose; involucral bracts in many rows; pappus-hairs simple, silky. Very milky plants; not alpine.

Our English species of Sow-Thistle, *S. oleraceus*, L., with very soft pinnatifid leaves; *asper*, All., with spiny leaves; and *arvensis*, L., with much larger capitules and auricled stem-leaves, are common in cultivated land. *S. palustris*, L., with pale yellow flowers and sagittate stem-leaves, is occasionally met with in marshes in Southern Switzerland.

62. Prenanthes, L.

Flowers purple; capitules small, numerous, few-flowered; involucral bracts in one row, few; pappus-hairs simple.

P. purpurea, L.; stem much branched, glabrous, leaves cordate-amplexicaul, bluish-green beneath; mountain woods, common.

63. Chondrilla, L.

Flowers yellow; capitules of only 7–12 flowers in two rows; involucral bracts few, in one row, surrounded by small scales; pappus-hairs simple, white; achene beaked, with five spine-like teeth.

C. juncea, L.; stem 2–3 ft., capitules small, racemose, radical leaves runcinate, stem-leaves linear; dry hills; Western Switzerland, Pyrenees. *C. prenanthoides*, Vill.; stem 8–12 in., capitules larger, corymbose, radical leaves obovate-lanceolate, toothed, upper leaves linear; beds of mountain streams; Grisons, St. Gallen, Tirol, Salzburg, Carinthia.

64. Lactuca, L.

Flowers yellow or blue; capitules generally small, few-flowered, corymbose; involucral bracts in several rows; pappus of many soft slender feathery hairs; fruit beaked.

A. Flowers blue:—*L. perennis*, L.; capitules large, on long stalks, involucral bracts cordate, lower leaves pinnatifid, upper lanceolate, stem very thick ($\frac{1}{2}$–1 in. diam.); stony slopes; Switzerland, Jura, Pyrenees, local. *L. alpinus*, Benth. (*Sonchus alpinus*, L., *Mulgedium alpinum*, Less.); stem 2–4 ft., purple, glandular-hairy, capitules large (1 in. diam.), racemose, leaves lyrate with a very large terminal segment; high, not uncommon; Switzerland, Jura, Vosges, Pyrenees. *L. Plumieri*, G. and G. (*Sonchus Plumieri*, L.); involucral bracts cordate, lower leaves

very large, runcinate, with winged leaf-stalk; Western Switzerland, Jura, Vosges, Dauphiny, Pyrenees.

B. Flowers yellow; stem-leaves decurrent:—*L. viminea*, Lk. (*Phœnixopus vimineus*, Rchb.); flowers pale yellow, slightly violet beneath, stem simple, white, 2–4 in.; stony places; Valais, Dauphiny, Piedmont, Pyrenees. *L. chondrillæflora*, Bor.; stem branched, flowers bright yellow on both sides; Pyrenees.

C. Flowers yellow; stem-leaves not decurrent:—The four English species:—*L. muralis*, Fresn.; leaves lyrate-pinnatifid; very common. *L. virosa*, L.; leaves bristly beneath; waste places, occasional. *L. Scariola*, L.; less prickly, capitules smaller; stony places, local. *L. saligna*, L.; scarcely bristly, capitules sessile, crowded, flowers pale yellow; Western Switzerland, local.

65. Crepis, L.

Flowers yellow, orange, or pink; capitules small, numerous, many-flowered; involucral bracts numerous, linear; stem usually branched, few-leaved; pappus-hairs in many rows, simple, silky.

A. Flowers pink or white:—*C. montana*, Scop. (*incarnata*, Wulf.); capitules numerous, corymbose, stem nearly leafless; pastures; Tirol, Carniola, rare.

B. Flowers orange-red:—*C. aurea*, Cass.; stem usually unbranched, nearly leafless, capitule solitary, stem and involucre covered with black hairs, leaves glabrous; pastures; Alps, Jura, Dauphiny, Pyrenees, Carpathians.

C. Flowers yellow; stem nearly leafless:—*C. præmorsa*, Tausch.; stem simple below, panicled above, leaves nearly entire; bushy; Switzerland, Jura, Vosges.

C. pygmæa, L.; stem somewhat prostrate, leaves sinuate-dentate, leaf-stalk winged; high; Switzerland, Tirol, Piedmont, Dauphiny, Pyrenees. *C. Frölichiana*, DC. (*parviflora*, Schleich.); flowers light yellow, capitules 3–7; pastures, local. *C. jubata*, Koch; stem simple, 1–2 in., capitule solitary, involucre woolly; Switzerland, Tirol, rare.

D. Flowers yellow; stem more or less leafy:—*C. virens*, L., nearly glabrous, upper leaves sagittate; *C. biennis*, L., hispid, upper leaves sessile; and *C. tectorum*, L., with the leaves rolled back at the edges, are common lowland plants. The following are alpine or sub-alpine:—*C. hyoseridifolia*, Tausch. (*tergloviensis*, Kern.); stem simple, leafy to the top, thickened beneath the solitary capitule, stem and involucre woolly; high, local. *C. blattarioides*, Vill.; capitules 1–5, large, flowers light yellow, upper part of stem leafless, stem-leaves cordate or sagittate, amplexicaul; high, local. *C. chondrilloides*, L. (*Jacquini*, Tausch.); stem branched, involucre nearly glabrous, lower leaves nearly entire, stem-leaves pinnatifid; alpine pastures. *C. alpestris*, Tausch.; stem not thickened below the capitule, leaves sinuate-dentate or runcinate; alpine pastures. *C. pontana*, L. (*Soyeria montana*, Jacq.); capitules very large (1½ in.), stem thickened below the capitule, leaves irregularly denticulate; Alps, Jura, Pyrenees. *C. grandiflora*, Tausch. (*conyzæfolia*, Gou.); capitules large, 2–10, leaves glandular-pubescent, stem-leaves sagittate-amplexicaul; dry, local. *C. hieracioides*, W. and K. (*succisæfolia*, Tausch.); capitules several, leaves rounded at the base, glabrous or hairy, nearly entire, flowers golden-yellow; pastures, frequent. *C. lampsanoides*, Fröl.; involucral bracts acuminate, radical and

lower stem-leaves lyrate, upper auriculate-amplexicaul, flowers dark yellow; Pyrenees. *C. paludosa*, Mœnch.; capitules numerous, stem-leaves cordate or sagittate, involucre covered with black glandular hairs; damp woods.

E. Flowers golden-yellow; lower involucral bracts greatly elongated:—*C. albida*, Vill.; capitule usually solitary, on a long leafless stalk, stem glandular-pubescent, whole plant whitish; Dauphiny, Pyrenees.

66. Barkhausia, Mœnch.

Resembling *Crepis*, but achenes beaked, minutely hispid. Not alpine.

The two English species, *B. fœtida*, DC., fœtid, with yellow styles and flower-stalk thickened upwards; and *taraxacifolia*, DC., with brown styles and very slender flower-stalks, not unfrequent on dry banks; also *B. setosa*, Hall., involucre covered with very stiff yellowish hairs; in cultivated fields.

67. Hieracium, L.

Flowers yellow or orange; capitules solitary, or more often numerous, corymbose; involucral bracts in several rows; receptacle naked, pitted; fruit not beaked; pappus-hairs in one row, simple, rigid, brown.

The Hawkweeds are among the most difficult genera of flowering plants. Different authors differ very widely as to the value of the specific characters; the extreme forms pass into one another by insensible gradations; and hybridisation appears to be common. Gremli enumerates 85 Swiss species, and Dalla Torre 94 as natives of the Alps; while Hooker includes the very numerous English

forms under only 10 species. No attempt is made here even to enumerate all the forms which are regarded as species by the compilers of Swiss floras; the leading types only are mentioned, round which the remainder may be regarded as grouping themselves.

A. Stem simple, leafless or with very few leaves; capitules very few; flowers light yellow; plant usually with long runners:—*H. Pilosella*, L.; a very common lowland species; with which are associated the alpine forms *Hoppeanum*, Schultz; *Peleterianum*, Mér; and *tardans*, N. P.

B. Resembling the last, but stem more leafy; capitules more numerous:—*H. Auricula*, Law., a lowland species; with the alpine forms *fuscum*, Vill.; *acutifolium*, Vill. (*furcatum*, Hoppe); *alpicolum*, Schleich.; and *glaciale*, Reyne.

C. Resembling the last, but stem much branched, leafy; capitules numerous, crowded; flowers often orange:—*H. aurantiacum*, L.; *piloselloides*, Vill.; *Laggeri*, Schultz.

D. Root-stock without stolons, but with rosettes of radical leaves at the time of flowering; capitules solitary, umbellate; involucral bracts in many rows.

a. Pits of receptacle neither ciliate nor margined:—*H. helveticum*, Brügg.; *alpinum*, L.; *nigrescens*, Fries; *glanduliferum*, Hoppe; *armerioides*, Arv.; *piliferum*, Hoppe; *Bernense*, Christ; *villosum*, L.; *flexuosum*, W. and K.; *dentatum*, Hoppe; *glabratum*, Hoppe; *arenicola*, Godr.; *bupleuroides*, Gmel.; *porrifolium*, L.

b. Pits of receptacle with a ciliate or slit membranous margin; involucre and stalk of capitule glandular-hairy:—*H. longifolium*, Schleich.; *amplexicaule*, L.; *pulmonarioides*, Vill.

E. Capitules usually numerous, in terminal cymes; involucral bracts in a single row, with one or two outer rows:—*H. humile*, Jacq.; *lacerum*, Reut.; *Trachselianum*, Christ; *cæsium*, Fr.; *Schmidtii*, Tausch.; *atratum*, Fr.; *rupicolum*, Fr.; *alpestre*, Griseb.; *canescens*, Schleich.; *porrectum*, Fr.; *pseudoporrectum*, Christ; *Epimedium*, Fr.; *jurassicum*, Fr.; *macilentum*, Fr.

F. Root-stock without stolons; radical leaves withered at the time of flowering; stem leafy:—*H. intybaceum*, Wulf.; *valesiacum*, Fr.; *macrocephalum*, Hut.; *picroides*, Vill.; *ochroleucum*, Schleich.; *valdepilosum*, Vill.; *strictum*, Fr.; *perfoliatum*, Fröl.; *prenanthoides*, Vill.; *denticulatum*, Sm.; *umbellatum*, L.; *gothicum*, Fr.

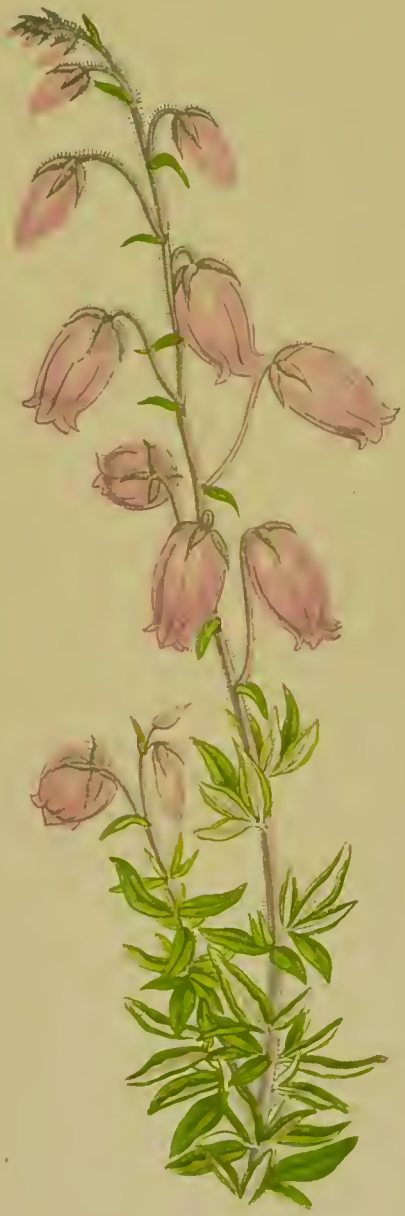
Several of the common English species, which occur also in Switzerland, are not mentioned in the above list; as *H. murorum*, L. (including *pallidum*, Fr.), nearly related to *H. cæsium*; *H. sylvaticum*, Fr. (including *vulgatum*, Fr., and *tridentatum*, Fr.), nearly related to *gothicum*; and *H. boreale*, Fr. (*sabaudum*, Sm.).

The number of species of *Hieracium* named by Philippi as natives of the Pyrenees is 31; the mountain species are mostly the same as those of the Swiss Alps, but the number of forms is not so large.

68. Chlorocrepis, Griseb.

Resembling *Hieracium*, but pappus white, soft, and flexible.

C. staticifolia, Griseb. (*Hieracium staticifolium*, Griseb.); flowers light yellow, capitules 1–3, stem leafless, radical leaves bluish-green, glaucous, linear-lanceolate; Switzerland, Jura, Dauphiny.



LXV.—DABEOCIA POLIFOLIA.

Order XLVIII.—VACCINIACEÆ.

Flowers regular; calyx 4–5-lobed, often minute; corolla regular, 4–5-cleft; stamens 8–10, anthers opening by terminal pores or slits; ovary inferior; fruit a berry. Small woody usually evergreen shrubs, often with edible berries, belonging to the colder parts of the globe, mostly American.

1. VACCINIUM, L.

Flowers solitary or in racemes, white or red; calyx-tube short; style filiform.

V. Myrtillus, L., Whortleberry, Bilberry; stem erect, somewhat winged, leaves deciduous, flowers solitary, pale-green tinged with red, berry blue-black; woods, common. *V. Vitis-Idæa*, L., Cowberry; prostrate, evergreen, flowers in terminal racemes, corolla campanulate, white or red, berry red; woods, common. *V. uliginosum*, L.; creeping, leaves deciduous, flowers in small clusters, corolla pale pink, berry black; bogs, not uncommon. *V. Oxycoccos*, L. (*Oxycoccos palustris*, Pers.), Cranberry; stem filiform, creeping, leaves small, evergreen; flowers on long stalks, nodding, red, corolla rotate, berry red; bogs.

Order XLIX.—ERICACEÆ.

Flowers regular; calyx 4–5-lobed, often minute; corolla 4–5-lobed, campanulate; stamens 4–10, hypogynous, anthers opening by terminal pores or slits, often awned; ovary superior; fruit a berry, drupe, or capsule. Chiefly in the cooler parts of the globe; especially abundant in Western Europe, the Himalayas, and at the Cape.

1. Erica, L.

Leaves in whorls, very narrow and rigid; stamens 8, anthers awned; ovary 4-celled; fruit a 4-celled capsule.

E. carnea, L.; leaves four in a whorl, corolla pink, stamens and style projecting beyond the corolla; Alps, Carpathians. Our two common English species of Bell-Heather, *E. cinerea*, L., and *Tetralix*, L., are entirely absent from Switzerland, but occur at low elevations in the Pyrenees.

2. Calluna, Salisb.

Leaves minute, decussate; flowers axillary; sepals coloured; stamens 8, anthers awned; fruit a 4-celled capsule.

C. vulgaris, Salisb., Ling; common.

3. Dabeocia,* Don.

Flowers large, in terminal racemes; sepals 4; corolla 4-lobed, pitcher-shaped; stamens 8, not awned.

D. polifolia, Don (*Menziesia polifolia*, Sm.), St. Dabeoc's Heath (Pl. 65); flowers pink, drooping, stem 1–2 ft., decumbent, glandular-hairy, leaves elliptical, with recurved margins, white and woolly beneath; Pyrenees.

4. Phyllodoce, Salisb.

Flowers large, pitcher-shaped, in terminal umbels; sepals 5; corolla 5-lobed; stamens 10, not awned.

P. cærulea, Bab. (*Menziesia cærulea*, Sm.) (Pl. 66);

* Often erroneously spelt *Dabœcia*.

LXVI. PHYLLODOCE CERULEA

LXVII.—RHODODENDRON CHAMÆCISTUS.

flowers few, purple, on long stalks, leaves linear, crowded, rigid, with reflexed margins; Pyrenees, Carniola.

5. Loiseleuria, Desv.

Stem shrubby, rigid, branching; flowers terminal; sepals, corolla-lobes, and stamens 5 each; leaves small, entire, opposite, with revolute margins. Alpine.

L. procumbens, Desv. (*Azalea procumbens*, L.); flowers small, in clusters of 2–4, pink, leaves oval; high; Alps, Carpathians, Pyrenees.

6. Rhododendron, L.

Flowers large, handsome, usually red; sepals and corolla-lobes 5 each; stamens 10; leaves alternate, often large. European species alpine.

Two species of Alpine Rose are common in Switzerland, and appear to replace our Heaths:—*R. ferrugineum*, L. (Fig. 68); flowers pendant, in terminal umbels, calyx-lobes broader than long, leaves glabrous, glandular-viscid and rusty brown beneath. *R. hirsutum*, L.; flowers pendant, in terminal umbels, calyx-lobes longer than broad, leaves ciliate, green on the under-side; both fairly common at high elevations. Also *R. Chamæcistus*, L. (Fig. 67); flowers solitary or few, erect, pale pink, leaves crowded; high; Tirol, Lombardy, Carniola, Carpathians.

7. Arctostaphylos, Adans.

Flowers in terminal racemes, white or pale red; sepals 5; corolla globose, with five reflexed teeth; stamens 10, anthers awned; fruit a drupe, with 5–10 stones. Alpine.

A. alpina, Spreng.; raceme 2–6-flowered, flowers greenish-white, leaves thin, deciduous, crenate, fruit black; Alps, Jura, Carpathians, Dauphiny, Pyrenees. *A. uva-ursi*, Spreng.; raceme 6–10-flowered, flowers pink, leaves leathery, thick, entire, fruit red; Alps, Jura, Dauphiny, Pyrenees.

8. Andromeda, L.

Stem shrubby; flowers in terminal umbels; sepals 4; corolla 5-lobed; stamens 10, anthers awned; fruit a 5-valved capsule. Alpine.

A. polifolia, L.; flowers drooping, purplish, with revolute lobes, leaves elliptic-lanceolate, leathery, glaucous, with revolute margins; bogs; Switzerland, Jura, Vosges, Tirol, Pyrenees.

9. Pyrola, L.

Flowers solitary or in racemes, usually white, nodding; sepals 5; petals 5, nearly or quite distinct; stamens 10; leaves shining, evergreen.

A. Petals quite distinct; flowers in racemes, small, nearly white; Winter-Green:—*P. minor*, L.; calyx-lobes triangular-oval, style shorter than the ovary, leaves orbicular-cordate, slightly crenate; woods; Alps, Jura, Vosges, Pyrenees, frequent. *P. media*, Sw.; calyx-lobes oval-lanceolate, style deflexed, leaf-stalk broadly winged; woods; South-Western Switzerland, Tirol, Piedmont, Dauphiny, rare. *P. rotundifolia*, L.; calyx-lobes lanceolate-acuminate, raceme many-flowered, leaves orbicular-obovate, style long, deflexed; moist woods; Switzerland, Jura, Pyrenees, rare. *P. chlorantha*, Sw.; resembling

LXVIII.—RHODODENDRON FERRUGINEUM.

LXIX.—PYROLA UNIFLORA.

the last, but raceme fewer-flowered, calyx-lobes oval-triangular, corolla greenish; woods; Switzerland, Dauphiny, Pyrenees, rare. *P. secunda*, L.; raceme unilateral, leaves ovate, acute, crenate-dentate; woods, frequent.

B. Flowers solitary, large; petals slightly coherent:—*P. uniflora*, L. (*Moneses grandiflora*, Salisb.) (Fig. 69); stigma 5-lobed, leaves nearly round, serrate; moist woods, rare.

C. Flowers in umbels:—*P. umbellata*, L. (*Chimaphila umbellata*, Nutt.); flowers in umbels of 5–6, pink; leaves in whorls, lanceolate, dentate; moist woods; Switzerland, Vosges, Styria, rare.

10. MONOTROPA, L.

Leafless brown parasites on the roots of trees; flowers in racemes; petals saccate at the base; calyx-lobes, corolla-lobes, and stamens variable in number. Not alpine.

M. Hypopithys, L. (including *glabra*, Bernh.), (*Hypopithys multiflora*, Scop.), Bird's-nest; stem fleshy, whole plant yellowish-brown; fir and beech woods, occasional.

Ledum palustre, L.; an arctic bog-plant, with white flowers in terminal umbels, is reported from Styria.

Order L.—PLUMBAGINEÆ.

Flowers regular; calyx tubular, 5-lobed; petals 5; stamens 5; ovary superior, 1-celled; ovule solitary, suspended from a long basal funicle; fruit enclosed in the persistent calyx-tube. A small widely distributed order; the European species chiefly maritime.

1. ARMERIA, Willd.

Leaves all radical, narrow; flowers small, on naked scapes, collected into dense umbellate cymes, surrounded by an involucre of bracts; calyx funnel-shaped.

A. alpina, Willd.; leaves linear, acute; probably an alpine form of *A. vulgaris*, Willd. (*Statice Armeria*, L.), the Thrift or Sea-Pink; high elevations, rare; Furka, Styria, Carpathians, Dauphiny, Pyrenees. *A. plantaginea*, Willd.; leaves somewhat broader, outer involucral bracts acuminate; Valais (very rare), Dauphiny, Pyrenees.

Order LI.—OLEACEÆ.

Flowers small, unisexual or bisexual; calyx 4-lobed or 0; petals 4 or 0; stamens 2; leaves simple, or pinnate with an odd leaflet, always opposite; fruit a berry or samara. A small order of trees or shrubs; mostly Northern. Not alpine.

1. LIGUSTRUM, Tourn.

Flowers small, white, in terminal cymes; calyx small, 4-toothed; corolla 4-lobed; fruit a 2-celled berry. Shrubs with opposite entire usually evergreen leaves.

L. vulgare, L., Privet; thickets and hedges, common.

2. FRAXINUS, Tourn.

Flowers diœcious; calyx and corolla often 0; fruit a broadly winged samara. Trees with opposite pinnate leaves.

F. excelsior, L., Ash; common. *F. Ornus*, L., the

LXX.—ANDROSACE VILLOSA.

Manna-ash, with white flowers in a terminal thyrse, is doubtfully wild in the South.

Order LII.—PRIMULACEÆ.

Calyx 5-cleft; corolla regular, 5-lobed, rarely 0; stamens 5, epipetalous, opposite the corolla-lobes; ovary 1-celled, with central placentation; style 1; stigma capitate; style often of different lengths in different individuals; fruit a capsule. A very large order, belonging chiefly to the Temperate and Arctic Zones.

1. ANDROSACE, Tourn.

Flowers small, white, yellow, or pink, in umbels surrounded by an involucre of bracts, or solitary in the axils of the leaves; corolla rotate, 5-lobed, with a long tube. A very pretty genus of almost exclusively alpine plants.

A. Flowers solitary, yellow:—*A. Vitaliana*, Nees (*Aretia Vitaliana*, L., *Gregoria Vitaliana*, Dub.); corolla-tube twice as long as calyx, corolla-lobes entire, stem prostrate, leaves linear, in rosettes; high; Valais, Piedmont (Mont Cenis), Tirol, Pyrenees, rare.

B. Flowers in umbels, red or pink; alpine plants:—*A. carnea*, L.; flowers pink, corolla-lobes entire, stem, flower-stalk, and calyx hairy, leaves linear-subulate, narrowed upwards; high; Switzerland, Tirol, Vosges, Dauphiny, Pyrenees, local. *A. Wulfeniana*, Sieb.; flowers red, pink, or purple, stalked, about $\frac{1}{3}$ in. diam., funnel-shaped, with cordate corolla-lobes, leaves small, hairy; rare; Carinthia, Styria, Salzburg. *A. Hausmanni*, Leyb.; flowers reddish, $\frac{1}{6}$ in. diameter, saucer-shaped, with emar-

ginate corolla-lobes, plant very cæspitose; rare; Southern Tirol, Styria, Carpathians. *A. Heerii*, Heg.; flowers pink, ⅓ in. diam., saucer-shaped, leaves elliptic-lanceolate, blunt; Switzerland, very rare (Martinsloch).

C. Flowers in umbels, white; alpine plants:—*A. villosa*, L. (Fig. 70); flowers white with yellow or dark red throat, on short stalks, leaves crowded into hemispherical rosettes, linear-oblong, ciliate, woolly; Jura, Dauphiny, Styria, Carniola, Pyrenees. *A. lactea*, L.; flowers 2–3, in an umbel or solitary, rather large, pure white, with cordate corolla-lobes, on long stalks, leaves linear, stem, flower-stalk, and calyx glabrous; dry, at high elevations; Stockhorn, Jura, Vosges, Piedmont, Dauphiny. *A. obtusifolia*, All.; flowers white or pale pink, leaves lanceolate, blunt, ciliate, plant softly pubescent; Switzerland, Tirol, Carpathians, Erzgebirge, Dauphiny. *A. chamæjasme*, Host.; flowers white or pale pink with yellow throat, leaves elliptical, ciliate, in open rosettes, stem hairy, involucral bracts ciliate; Switzerland, Piedmont, Tirol, Carpathians.

D. Flowers in umbels; annual or biennial lowland plants:—*A. septentrionalis*, L.; flowers small, white or pink with yellow throat, calyx glabrous, shorter than the corolla; fields; Engadine, Nicolaithal, Saasthal, Tirol. *A. maxima*, L.; flowers larger, white with yellow throat, calyx hairy, longer than the corolla, involucral leaves very large; fields; Valais, Dauphiny, Pyrenees.

E. Flowers solitary, red or white:—*A. imbricata*, Lam.; flowers white or pink with red throat, shortly stalked, leaves covered with a dense grey tomentum; very high, rare; Valais, Ticino, Aar Glacier, Southern Tirol, Dauphiny, Pyrenees. *A. helvetica*, Gaud.; flowers white or light

LXXI PRIMULA FARINOSA.

LXXII.—PRIMULA LONGIFLORA.

pink with yellow centre, nearly sessile, plant densely cæspitose, leaves very small, blunt, pubescent; high, clefts of rocks. *A. glacialis*, Hoppe; flowers red, rarely white, stalked, corolla-lobes entire, plant cæspitose, leaves lanceolate, blunt, hairy; very high; Switzerland, Styria. *A. pubescens*, DC.; flowers white with yellow centre, leaves lanceolate, acute, hairy; Switzerland, Dauphiny, Pyrenees, rare. *A. Charpentieri*, Heer; flowers pink, on long stalks, corolla-lobes incised, plant cæspitose, leaves spathulate, blunt, hairy; very rare; Valais, Ticino. *A. pyrenaica*, Lam.; flowers white, on long stalks, with 2–3 lanceolate bracts, calyx pubescent, leaves lanceolate, keeled; Pyrenees. *A. cylindrica*, DC.; flowers small, white, on long hairy stalks, leaves in dense cylindrical rosettes, linear-lanceolate, hairy; Pyrenees.

2. PRIMULA, L.

Flowers in umbels surrounded by an involucre of bracts, rarely solitary, pink, violet, yellow, or white; stem always leafless; calyx 5-toothed; corolla funnel- or saucer-shaped, 5-lobed; stamens 5, epipetalous; ovary nearly globular, style filiform, stigma capitate; seed-vessel a 5-valved capsule. Many species of *Primula* display marked dimorphism or heterostyly—that is, some flowers have shorter and some longer styles; in the former, the nearly sessile anthers are placed in the throat of the corolla, nearly level with the stigma in the other form; in the latter, the anthers are fixed half-way down the corolla-tube, and again nearly level with the stigma in the other form. Since the flowers in the same plant are always all of one kind, this promotes cross-fertilisation

by the agency of insects, the pollen of the long-styled plants being deposited on the stigma of the short-styled plants, and *vice versâ*. Other examples of a similar heterostyly are presented by *Oxalis*, *Lythrum*, and *Pulmonaria*. Several of the yellow-flowered species of *Primula* are familiar meadow or hedge-row plants; all the rest are more or less alpine, and are especially characteristic of the range south of the Rhone Valley; the number of species in Northern Switzerland being comparatively small, and in the Pyrenees still smaller.

A. Flowers yellow:—*P. vulgaris*, Huds. (*acaulis*, L.), Primrose; common. *P. veris* (*officinalis*, Jacq.), Cowslip, Paigle; frequent. *P. elatior*, Jacq., Oxlip; distinguished by the open throat of the corolla, and the flowers being rather larger and paler than those of the Cowslip; very local in England, much the more common on the Continent. *P. Auricula*, L., the Auricula; flowers fragrant, leaves glabrous, upper side of the leaves, leaf-stalk, calyx, and throat of the corolla covered with white meal; local; Switzerland, Jura, Dauphiny, Pyrenees, Carpathians. *P. Balbisii*, Lehm.; flowers scentless, leaves with a few glandular hairs, calyx usually not mealy; Tirol, very rare (Monte Baldo).

B. Flowers red or violet, rarely white; leaves mealy beneath or on the margin:—*P. farinosa*, L. (Pl. 71), Bird's-eye Primrose; corolla-tube somewhat longer than calyx, calyx-teeth ovate, scape 2–6 in.; damp meadows; one of the commonest and prettiest of the sub-alpine plants. *P. longiflora*, All. (Pl. 72); flowers much larger, corolla-tube three times as long as corolla, calyx-teeth lanceolate; alpine pastures; local. *P. venusta*, Host.; calyx and throat of corolla mealy, leaves obovate,

LXXIII.—PRIMULA MARGINATA.

LXXIV.—PRIMULA CALYCINA.

dentate-serrate; Southern Tirol, Carniola, rare. *P. marginata*, Curt. (Pl. 73); calyx mealy within, leaves ovate-elliptical, with white mealy cartilaginous margin, coarsely serrate; Western Alps, Piedmont, Dauphiny.

C. Flowers purple, lilac, or violet; leaves glabrous on both sides, not mealy; margin of leaf usually not cartilaginous:—*P. carniolica*, Jacq.; flowers violet, fragrant, petals obcordate, leaves thick, obovate, nearly entire, completely glabrous; Southern Tirol, Lombardy, Carniola. *P. integrifolia*, L.; umbel 1–2-flowered, corolla-lobes deeply bifid, leaves entire, slightly glandular; Switzerland, Piedmont, Lombardy, Pyrenees. *P. calycina*, Dub. (*glaucescens*, Mor.) (Pl. 74); umbels 3–8-flowered, flowers red, corolla deeply bifid, calyx longer than corolla-tube, involucral bracts very narrow, leaves quite glabrous and entire, with narrow cartilaginous margin; Southern Switzerland, Lombardy. *P. alpina*, Schleich. (*rhætica*, Koch); flowers purple-violet, throat not mealy, corolla-lobes not deeply incised, umbel many-flowered, involucral bracts ovate, leaves toothed; Rhætian Alps. *P. pubescens*, Jacq. (*rhætica*, Gaud., *helvetica*, Don); resembling the last, but tube of corolla shorter, yellow, throat mealy, calyx-teeth long, acute; Tirol, rare (Gross-Glockner, Gnitschthal). *P. discolor*, Leyb.; resembling *alpina*, but corolla purple-violet, with wide tube, calyx-teeth short, blunt; South-Western Tirol. *P. Muretiana*, Mor.; umbel 2–4-flowered, corolla-lobes deeply incised, involucral bracts ovate-lanceolate, leaves downy, dentate near the tip; Switzerland, Tirol. *P. glutinosa*, L.; flowers violet, umbel 3–6-flowered, corolla-lobes deeply divided, calyx nearly as long as corolla-tube, leaves oblanceolate, serrate above the middle, viscid; Eastern Switzerland, Tirol,

Lombardy, Styria, Carinthia, Carpathians. *P. minima*, L. (Pl. 75); flowers large, solitary, nearly sessile, pink, calyx-tube very narrow, nearly as long as corolla-tube, petals deeply bifid, leaves thick, shining, coarsely toothed at the tip, plant not more than 1 in. high; very high; Switzerland, Tirol, Styria, Carpathians. *P. Floerkeana*, Schrad.; umbel 3–5-flowered, stem and leaves somewhat viscid, leaves obovate, dentate above the middle; Tirol, Styria, rare.

D. Flowers lilac, purple, or violet; leaves not mealy, glabrous on both sides, with a thickened cartilaginous margin:—*P. Facchinii*, Schott (*Floerkeana*, Facch.); umbel 1–2-flowered, stem $\frac{1}{2}$–$1\frac{1}{2}$ in., leaves obovate, coarsely serrate; Southern Tirol, Carinthia. *P. Clusiana*, Tausch.; flowers purple, corolla-lobes deeply bifid, leaves glabrous, entire; Tirol, Styria, Carinthia, Salzburg, Carpathians. *P. spectabilis*, Tratt.; flowers large, purple ($\frac{1}{2}$–$\frac{3}{4}$ in. diam.), stem 2–4 in., umbels 1–5-flowered, leaves elliptical, nearly entire, with narrow white margin; Southern Tirol, Lombardy, Carniola, Carpathians. *P. Wulfeniana*, Schott; stem 1–3 in., umbels 1–3-flowered, flowers very large (1 in. diam.), leaves lanceolate, with broader margin; Tirol, Carniola, Carinthia, rare.

E. Flowers purple, lilac, or violet; leaves downy on both sides, not mealy; margin usually not cartilaginous, always dentate:—*P. pedemontana*, Thom. (Pl. 76); flowers lilac, stem about 6 in., leaves sinuate-dentate in the upper half, glandular-ciliate, whole plant somewhat viscid; Piedmont. *P. tiroliensis*, Schott; leaves thick and succulent, forming a dense imbricate rosette, glandular-viscid, with cartilaginous teeth, flowers large, solitary, pink, petals deeply bifid, calyx-tube very short, teeth triangular,

LXXV.—PRIMULA MINIMA.

LXXVI.—PRIMULA PEDEMONTANA.

spreading; Southern Tirol, rare. *P. viscosa*, All. (Pl. 77); flowers violet, corolla saucer-shaped, with a long slender tube, leaves soft, obovate, dentate above the middle; Engadine, Ticino, Tirol, Carinthia, Dauphiny, Pyrenees. *P. commutata*, Schott; flowers pink, umbel many-flowered, leaves spathulate, glandular-hairy, doubly serrate above the middle, involucral bracts ovate-lanceolate, acute; Styria. *P. villosa*, Wulf.; flowers light purple with white tube, calyx half as long as corolla-tube, teeth triangular, spreading, involucral bracts small, leaves obovate, coarsely toothed, whole plant viscid; Styria, Carniola, Carinthia, rare. *P. ciliata*, Schrk.; leaves strongly glandular-ciliate, serrate near the tip, calyx-teeth rather broad; Tirol, Salzburg. *P. confinis*, Rchb.; calyx-teeth broadly ovate, acute, leaves densely covered with brownish-red glandular hairs; Piedmont. *P. hirsuta*, Vill. (*latifolia*, Lap.); leaves thin, obovate or nearly orbicular, dentate, capsule shorter than the calyx; Switzerland, Tirol, Dauphiny, Pyrenees, frequent. *P. œnensis*, Thom. (*daonensis*, Leyb.); leaves thick, lanceolate-crenate, denticulate towards the tip, very viscid, capsule as long as the calyx; Switzerland, Tirol.

Other species are described in local floras, but many of them are probably hybrids.

3. Cortusa, L.

Flowers in an umbel, subtended by an involucre; corolla 5-lobed; stamens 5, united at the base into a tube; fruit a 5-valved capsule; leaves all radical.

C. Matthioli, L. (Pl. 78); flowers red-purple, campanulate, long-stalked, on a leafless hairy scape 3–6 in. high,

leaves cordate, palmately lobed, hairy, involucral bracts lanceolate, often bifid. This beautiful plant is found occasionally in moist woods at a high elevation in Southern Switzerland (Engadine), Tirol, Piedmont (Mont Cenis), Styria, Carinthia, and Salzburg.

4. Hottonia, L.

Flowers in racemes, heterostylous; corolla salver-shaped, 5-lobed, fringed; stamens 5; capsule 5-valved, valves cohering at the top. Aquatic herbs.

H. palustris, L., Water-Violet; flowers large, lilac with a yellow eye, leaves in whorls, pectinate, very deeply divided; ponds and ditches; Southern Switzerland (rare), Jura, Dauphiny, Pyrenees.

5. Soldanella, L.

Flowers solitary, on long stalks, or in few-flowered umbels; corolla drooping, finely divided into many linear segments, usually blue; leaves all radical; fruit a 5–6-valved capsule, each valve with two teeth. The beautiful Snowbells are among the most favourite alpine plants, the flowers making their appearance in the very earliest spring, often on the edge of the snow; they occur especially in the Swiss Alps.

A. Flowers in 2–5-flowered umbels; style as long as, or longer than the corolla:—*S. alpina*, L. (Pl. 79); leaves cordate-reniform, entire or slightly crenate, thick, glabrous, corolla divided half-way down, with five membranous scales between the stamens; alpine pastures; Switzerland, Jura, Black Forest, Erzgebirge, Pyrences. *S. montana*, Willd.; leaves roundish, crenate, light green, usually

LXXVII. - PRIMULA VISCOSA.

LXXVIII. CORTUSA MATTHIOLI.

violet beneath, upper part of scape and flower-stalks downy; bushy pastures, local; Tirol, Carinthia, Styria, Carpathians, Salzburg, Pyrenees. *S. pyrolæfolia*, S. and K.; leaves roundish, crenate, coriaceous, dark green, leaf-stalk very long, stem and flower-stalk glabrous; Carniola.

B. Flowers solitary or in pairs; style shorter than corolla:—*S. minima*, Hoppe (Pl. 80); flowers pale lilac, bell-shaped, corolla slit to ¼ its length, leaves small, nearly round, quite entire, thick and shining; very high; Grisons, Tirol, Carniola, Carinthia, Styria. *S. pusilla*, Baumg.; corolla slit to about ⅓ its length, without scales, violet, funnel-shaped, leaves cordate-reniform, somewhat sinuate, leaf-stalk glandular; very high, local; Switzerland, Tirol, Carinthia, Styria, Carpathians, Salzburg.

6. Cyclamen, L.

Flowers large, solitary, nodding, on leafless scapes, which are coiled spirally after flowering; corolla 5-lobed, lobes reflexed; stamens 5; seed-vessel a 5-valved capsule with reflexed valves; leaves all radical, undivided; root-stock tuberous.

C. europæum, L.; flowers fragrant, corolla pink or purple, rarely white, not toothed, leaves roundish-ovate, cordate or reniform, sinuate-crenate, root-stock globular; this beautiful plant is found occasionally on stony bushy hill-sides in Switzerland, Jura. *C. neapolitanum*, Ten.; flowers scentless, throat of corolla toothed; stony bushy hill-sides; Valais, very rare. *C. repandum*, Sm. (Pl. 81); flower red, longer than that of *C. europæum*, throat of corolla not toothed, leaves cordate-ovate, somewhat angular, root-stock elongated; Pyrenees.

7. Lysimachia, L.

Flowers yellow, solitary and axillary, or in spikes or racemes; calyx 5–6-toothed; corolla 5–6-lobed, rotate; stamens 5–6; capsule nearly globular, 5-valved; leaves usually opposite or in whorls. Not alpine.

A. Stem erect; flowers in cymes or racemes:—*L. vulgaris*, L., Yellow Loosestrife; flowers yellow spotted with orange, in panicled cymes, leaves opposite or in whorls of three; shores of lakes and streams, frequent. *L. punctata*, L.; resembling the last, but corolla-lobes glandular-ciliate; damp thickets, very rare; Bâle, Zürichhorn. *L. thyrsiflora*, L.; flowers smaller, in dense axillary branched racemes, corolla-lobes linear; marshes; Switzerland, rare.

B. Stem prostrate; flowers solitary in the axils of the leaves:—*L. Nummularia*, L., Creeping Jenny, Moneywort; flowers large, bell-shaped, leaves cordate, nearly round; damp places, common. *L. nemorum*, L., Yellow Pimpernel; flowers small, rotate, leaves ovate; woods and banks, common.

8. Anagallis, L.

Flowers solitary, axillary, red, pink, or blue, rotate; leaves opposite, entire; seed-vessel a 1-celled capsule splitting horizontally (pyxis). Not alpine.

A. arvensis, L., Scarlet Pimpernel, Poor Man's Weatherglass; flowers scarlet or rarely blue (*A. cærulea*, Schreb.); cultivated land, common. *A. tenella*, L., Bog Pimpernel; flowers very delicate, pale lilac with darker veins, leaves nearly round; bogs, rare; Valais, Tirol, Vosges, Pyrenees.

LXXX.—SOLDANELLA MINIMA.

LXXXI.—CYCLAMEN REPANDUM.

9. Centunculus, L.

Flowers minute, solitary, axillary; calyx-teeth, corolla-lobes, and stamens each 4–5; leaves usually opposite; capsule splitting horizontally. Not alpine.

C. minimus, L.; a very small plant with minute white or pink flowers, and small ovate glabrous sessile leaves; wet places, rare; Switzerland, Jura, Pyrenees.

10. Trientalis, L.

Flowers solitary, white, on slender erect flower-stalks; calyx-teeth, corolla-lobes and stamens each 5–9; leaves in whorls of 5–7; capsule splitting into five valves.

T. europæa, L. (Fig. 82); flowers 1–4, from a whorl of 5–7 leaves, calyx-teeth linear, leaves ovate, shining; sub-alpine heaths; very rare; Switzerland, Southern Tirol, Carniola, Pyrenees.

11. Samolus, Tourn.

Flowers small, white, in terminal racemes or corymbs; stamens 5; ovary ½-inferior; seed-vessel a 5-valved capsule. Not alpine.

S. Valerandi, L., Brookweed; stem partially prostrate, leaves obovate, entire, mostly alternate; wet places, rare; Valais, Jura, Vosges, Pyrenees.

Order LIII.—APOCYNACEÆ.

Flowers regular; calyx usually 5-toothed; corolla usually 5-lobed, lobes oblique, contorted in bud; stamens usually 5; ovary 2-celled; seed-vessel usually of two many-

seeded follicles; seeds often with a tuft of silky hairs; leaves opposite, entire. A large order, chiefly of tropical and sub-tropical trees and shrubs with a milky juice; the European species are very few; none are alpine.

1. Vinca, L.

Stem decumbent; flowers large, solitary, axillary, blue or white; style terminating in a pencil-like brush.

V. minor, L., Lesser Periwinkle; shady places, frequent. *V. major*, L., Larger Periwinkle; Pyrenees, naturalised in Southern Switzerland.

Order LIV.—ASCLEPIADEÆ.

Flowers regular; calyx 5-toothed; corolla 5-lobed; stamens usually 5, united into a column round the stigma; pollen coherent into a pollinium in each anther-lobe; ovary 2-celled, the carpels connate above; seed-vessel a pair of follicles, with numerous seeds clothed with silky hairs; leaves opposite, entire. A large order, chiefly of tropical and sub-tropical trees and shrubs with a milky juice; the number of European species is small; none are truly alpine.

1. Cynanchum, L.

Corolla rotate, 5-lobed, with five internal scales; stigma apiculate.

C. Vincetoxicum, R. Br. (*Vincetoxicum officinale*, Mœnch.); flowers small, yellowish-white, in axillary clusters of 2–3, stem erect, middle leaves cordate-ovate; rocky woods, frequent.

LXXXII.—TRIENTALIS EUROPÆA.

Order LV.—GENTIANACEÆ.

Flowers regular, solitary or in cymes; calyx 4–5-toothed; corolla 4–5-lobed; stamens 4–8; ovary usually 2-celled; seed-vessel usually a 1-2-celled capsule; leaves generally opposite and entire. A large order, belonging chiefly to the cold and temperate parts of the globe.

1. CHLORA, L.

Flowers yellow, in dichotomous cymes; calyx-teeth, corolla-lobes, and stamens 6–8 each; ovary 1-celled; style bifid; seed-vessel a 2-valved capsule. Not alpine.

C. perfoliata, L., Yellow Centaury; stem-leaves completely connate at the base; open hill-sides, frequent. *C. serotina*, Koch; a smaller plant with paler flowers, calyx-teeth longer, stem-leaves only partially connate; very rare; Canton de Vaud, Valais, Zürich.

2. ERYTHRÆA, Pers.

Flowers small, usually pink, in trichotomous cymes; corolla funnel-shaped; calyx-teeth, corolla-lobes, and stamens 4–5 each; anthers twisted spirally; ovary partially 2-celled. Not alpine.

E. Centaurium, Pers., Centaury, with numerous varieties; stem-leaves partially connate; banks, common.

3. SWERTIA, L.

Flowers in racemes; calyx 5-toothed; corolla rotate, 5-lobed, with two nectariferous glands; capsule 1-celled.

S. perennis, L.; stem 6–12 in., flowers blue-violet, on longish stalks, upper stem-leaves opposite, leaf-stalk square; boggy alpine meadows, local.

4. Pleurogyne, Esch.

Flowers solitary; calyx 5-toothed; corolla rotate, 5-lobed, bearded, without nectariferous glands; stigma sessile upon the ovary; capsule 1-celled.

P. carinthiaca, Griseb. (*Lomatogonium carinthiacum*, A. Br.); flowers light or dark blue, on long stalks, stem 1–2 in., branched, leafy, leaves ovate, acute; high alpine pastures, rare; Grisons, Valais (Saas, Zermatt), Glarus, Tirol, Carinthia, Carniola, Salzburg.

5. Gentiana, L.

Flowers solitary or in terminal cymes, usually deep blue; calyx-teeth, corolla-lobes, and stamens each 4–6; corolla often bearded at the throat; ovary 1-celled; stigmas 2, persistent; seed-vessel a 2-valved capsule. Although some species are lowland plants, the Gentians are especially an alpine genus, and are among the commonest and most beautiful of the plants of the higher Alps.

A. Flowers large, in whorls, yellow or purplish:—*G. lutea*, L. (Pl. 83); stem erect, 2–4 ft., corolla yellow with brown dots, 5-cleft nearly to the base, leaves thick, stem-leaves half-clasping; alpine pastures, frequent. *G. purpurea*, L.; calyx sheathing, split on one side only, corolla 6-lobed half-way down, purple outside, yellowish inside; pastures; Southern Switzerland, Vorarlberg, Tirol, rare. *G. pannonica*, Scop.; calyx-teeth equal, reflexed, corolla

purple spotted with black, leaves ovate-lanceolate; alpine pastures, frequent. *G. punctata*, L.; calyx-teeth equal, erect, corolla yellow with dark purple spots, 6-cleft for ¼ the length of the tube; alpine pastures, frequent. *G. Cruciata*, L.; corolla yellow, 4-cleft, leaves very large and thick, elliptic-lanceolate, decussate, with three very prominent ribs; damp pastures, common. *G. Burseri*, Lap. (*biloba*, DC.); resembling *punctata*, but corolla obconical-campanulate, anthers connate into a tube; Dauphiny, Pyrenees.

B. Flowers small, blue or violet; corolla 4-cleft, throat bearded:—*G. ciliata*, L.; flowers solitary, corolla azure-blue with greenish tube; moist rocky places, frequent. *G. tenella*, Rottb. (*glacialis*, Thom.); flowers on long stalks, corolla divided almost to the base, violet or white, stem 1–4 in., only slightly branched; very high, frequent. *G. campestris*, L.; calyx-teeth very unequal, the two outer lobes 3–4-times as broad as the inner ones, flowers lilac; sub-alpine pastures, common.

C. Resembling the last, but corolla usually 5-cleft:—*G. Amarella*, L.; stem 3–6 in., usually much branched, calyx-lobes nearly equal, flowers violet or white; pastures. *G. germanica*, Willd.; resembling the last, but larger and stouter, calyx-lobes more unequal; pastures, common. *G. obtusifolia*, Hoppe; stem erect, 3–12 in., calyx-teeth equal, linear-lanceolate, corolla violet, with a long tube, leaves 3-nerved, stem-leaves spathulate; pastures. *G. nana*, Wulf.; very dwarf, stem 1–1½ in., flowers small, solitary, violet with a white fringe, calyx inflated, divided almost to the base, stem-leaves few, very small, elliptic; very high, rare; Tirol, Carniola, Carinthia, Salzburg.

D. Flowers usually bright blue (azure), corolla 5-cleft, campanulate, throat not bearded:—*G. asclepiadea*, L.; stem 6–18 in., nearly simple, leafy, flowers large (1½–2 in.), axillary, upper leaves often in whorls; woods and thickets, frequent. *G. Frölichii*, Jan.; stem simple, 1–4 in., flowers solitary, terminal, 1 in. long, light blue, leaves lanceolate; high; Carniola, Carinthia. *G. frigida*, Hænk.; stem 3–4 in., nearly simple, flowers yellowish-white spotted with dark blue, solitary or in pairs, 1–1½ in. long, leaves linear-lanceolate; very high; Styria. *G. acaulis*, L. (Pl. 84); stem 1½–2 in., flowers very large, 1½–2 in. long, solitary, bright blue, calyx-teeth spreading, leaves thick, lanceolate, blunt, soft; alpine pastures, not uncommon. *G. Clusii*, P. and S.; resembling the last, but leaves stiff, coriaceous, acute, calyx-teeth erect and connivent; alpine pastures. *G. excisa*, Presl. (*alpina*, Vill.); similar, but leaves softer and broader, flowers smaller and paler; pastures; Alps, Jura, Pyrenees. *G. Pneumonanthe*, L.; stem 1½–12 in., nearly simple, flowers large, bright blue, 1½–2 in. long, on short stalks, leaves linear or linear-lanceolate; marshes, not uncommon.

E. Resembling the last section; but corolla rotate or saucer-shaped:—*G. bavarica*, L. (Pl. 85); flowers azure, ½–¾ in., terminal and solitary, stem 2–3 in., leaves small, ovate or obovate, only a few distant pairs on the stem; moist, high, frequent. *G. imbricata*, Fröl. (*tergloviensis*, Hacq.); flowers smaller, paler, leaves small, ovate-lanceolate, densely crowded; very high; Tirol, Carinthia, Carpathians. *G. pumila*, Jacq.; stem 1–2 in., simple, flowers solitary, bright blue, leaves linear-lanceolate, radical leaves in dense tufts; Tirol, Carniola, Carinthia, Styria, Carpathians. *G. brachyphylla*, L.; flowers solitary, sessile, azure, leaves

LXXXIV.—GENTIANA ACAULIS.

LXXXV.—GENTIANA BAVARICA.

small, thick, nearly orbicular, in densely imbricate rosettes; alpine pastures, local. *G. verna*, L. (Pl. 86); stem 1–2 in., flowers solitary, azure, about 1 in., angles of the calyx winged, leaves elliptic-lanceolate, not in rosettes; alpine and sub-alpine pastures, common. *G. æstiva*, R. S. (*angulosa*, Bieb.); flowers somewhat larger, angles of the calyx with broader wings, leaves lanceolate; pastures, frequent. *G. pyrenaica*, L.; stem $1\frac{1}{2}$–$2\frac{1}{2}$ in., flowers solitary, calyx with five triangular appendages between the lobes, leaves stiff, linear, mucronate; Pyrenees.

F. Corolla blue, 5-lobed, not bearded; annual plants:— *G. utriculosa*, L.; stem 2–8 in., branched, flowers terminal, azure, about $\frac{3}{4}$ in. long, calyx inflated, with broad wings at the angles, radical leaves in rosettes, nearly orbicular, stem-leaves lanceolate; marshy meadows, frequent. *G. nivalis*, L.; stem 2–4 in., branched, flowers small ($\frac{1}{2}$–$\frac{3}{4}$ in.), azure, calyx slender, cylindrical, angular, radical leaves ovate, in rosettes, stem-leaves lanceolate; high alpine pastures, frequent. *G. prostrata*, Hænke; stem about 2 in., prostrate, branched, flowers small, light blue, with triangular appendages between the corolla-lobes, calyx cylindrical, with projecting angles, leaves obovate, not in rosettes; Tirol, Styria, Carniola, Carinthia, Carpathians, Salzburg.

6. MENYANTHES, L.

Flowers in racemes; calyx-teeth, corolla-lobes, and stamens each 5; corolla fleshy; ovary 1-celled; stem leafless; radical leaves of three leaflets. Bog plants.

M. trifoliata, L., Bog-Bean; flowers white or pink; bogs, frequent.

7. Limnanthemum, Gmel.

Flowers yellow, in umbels; calyx 5-toothed; corolla-lobes and stamens 5–8; ovary 1-celled; leaves cordate or peltate, floating. Aquatic plants.

L. peltatum, Gmel. (*Villarsia nymphæoides*, Vent.); ponds and slow streams, very rare; reported from Bâle.

Order LVI.—POLEMONIACEÆ.

Flowers in terminal dichotomous cymes; calyx-teeth, corolla-lobes, and stamens 5 each; ovary 3-celled; stigmas 3; seed-vessel a many-seeded 3-celled capsule. A small order, chiefly American, with very few European species.

1. Polemonium, L.

Leaves pinnate; flowers in dense corymbose cymes.

P. cæruleum, L., Jacob's Ladder; flowers large, $\frac{3}{4}$–1 in., drooping, violet or white, leaves of a large number of lanceolate leaflets; bushy places, rare; Bâle, Bern, Jura, Tirol, Carniola, Pyrenees.

Order LVII.—CONVOLVULACEÆ.

Flowers regular; sepals, petals, and stamens 5 each; filaments often unequal and dilated at the base; ovary 2–4-celled, ovules few in each cell; seed-vessel a 1–4-celled capsule; leaves, when present, large and simple. A large order of twining or climbing, or of leafless para-

LXXXVI.--GENTIANA VERNA.

sitic plants, in the former case containing a milky latex; chiefly tropical, with no alpine species.

1. Convolvulus, L.

Flowers large, axillary, fugacious; corolla twisted in bud; ovary 2-celled, with two seeds in each cell. Prostrate or twining herbs, with undivided leaves and a milky latex.

C. sepium, L. (*Calystegia sepium*, Br.), Larger Bindweed, with very large white flowers; and *C. arvensis*, L., Smaller Bindweed, with smaller white or pink flowers; both very common, the former in hedges, the latter by road-sides.

2. Cuscuta, L.

Leafless parasites, entirely destitute of leaves, with very slender red stem, provided with "haustoria" or sucking-organs, by which they are attached to the host-plant, and dense clusters of small wax-like flowers. The species of Dodder are difficult to distinguish, and are best recognised by the plants on which they are parasitic, and to which they are frequently very destructive.

C. europæa, L., the species with largest flowers; occasional on stinging-nettle, hop, and other plants, especially by water-sides. *C. epithymum*, L., much the commonest species; on gorse (in this country), thyme, and other plants. *C. Trifolii*, Bab., Clover Dodder; on clover and lucerne; very destructive. *C. Epilinum*, Weihe, Flax Dodder; on flax; very destructive. *C. suaveolens*, Ser. (*corymbosa*, R. and P., *racemosa*, Mart.), with flowers in corymbose panicles; on lucerne.

Order LVIII.—BORRAGINEÆ.[1]

Flowers usually regular, in scorpioid cymes; calyx persistent, 5-lobed, valvate; corolla 5-lobed, often with 5 projections (staminodes) between the stamens; stamens 5, epipetalous; ovary 4-lobed, 4-seeded; fruit of four indehiscent 1-seeded nutlets; leaves alternate, undivided and entire, usually hispid. A large order, belonging to all climates, especially the warmer temperate; but with very few alpine species.

1. CERINTHE, Tourn.

Ovary composed of two carpels; corolla yellow, throat naked, without scales; plant glabrous. Alpine.

1. *C. major*, L. (*aspera*, Roth); corolla golden-yellow with red centre, or purple, anthers as long as the filaments, leaves ciliate; very rare; Sion. *C. alpina*, Kit. (*glabra*, Mill.); corolla light yellow spotted with red, anthers four times as long as filaments, leaves not ciliate; dry places at a high altitude, local. *C. minor*, L.; a smaller plant, with smaller flowers and narrower corolla-lobes; Dauphiny.

2. SYMPHYTUM, L.

Corolla regular, tubular, throat closed with scales; flowers in terminal forked cymes; leaves hispid, stem-leaves usually decurrent; carpels 4. Not alpine.

S. officinale, L., Comfrey; stem branched, strongly winged from the decurrent leaves; wet places, common.

[1] Usually spelt *Boragineæ* in English botanical works, and the genus from which the order takes its name, *Borago*.

LXXXVII.—LITHOSPERMUM PROSTRATUM.

S. tuberosum, L.; stem nearly simple, not strongly winged, corolla-scales enclosed, root-stock very fleshy; Friburg, Ticino, Pyrenees. *S. bulbosum*, Schimp.; stem nearly simple, not strongly winged, corolla-scales prominent, root-stock slender, tubercular; Locarno.

3. Anchusa, L.

Corolla regular, salver-shaped, throat clothed with scales; flowers in scorpioid cymes; carpels 4. Not alpine.

A. arvensis, Bieb. (*Lycopsis arvensis*, L.), Bugloss; flowers blue, corolla-tube curved; waste places, common. *A. officinalis*, L., Alkanet; corolla-tube straight, flowers purple-blue; Switzerland, occasional, Pyrenees. *A. italica*, Retz.; corolla-tube straight, flowers azure-blue, corolla-scales tufted; Southern Switzerland, occasional, Pyrenees.

4. Onosma, L.

Corolla regular, campanulate, without scales; carpels 4; flowers yellow.

O. echioides, L.; flowers large, pendant in bud, pale yellow, anthers included, stem 4–8 in., leaves very rough; high; Dauphiny, Pyrenees. *O. arenarium*, W. and K. (including *helveticum*, Boiss., and *vaudense*, Grml.); a smaller plant, with smaller flowers and exserted anthers; Rhone Valley.

5. Lithospermum, L.

Corolla regular, funnel- or salver-shaped, throat naked or clothed with scales; flowers in bracteate cymes; nutlets 4, very hard.

L. arvense, L.; flowers small, white, stem annual, nutlets wrinkled; cultivated land, common. *L. officinale*, L., Gromwell; flowers small, yellowish-white, stem perennial, nutlets smooth, shining; road-sides. *L. purpureo-cæruleum*, L.; flowers large, purplish-blue, cymes few-flowered; mountain woods; Southern Switzerland (rare), Jura, Pyrenees. *L. prostratum*, Lois (Pl. 87); flowers large, bright blue, axillary, velvety-pubescent within, stem prostrate, woody; sandy places; Pyrenees.

6. Echium, L.

Flowers irregular, large, in unilateral cymes, throat naked, filaments unequal, with exserted anthers; leaves hispid; nutlets 4. Not alpine.

E. vulgare, L., Viper's Bugloss; flowers pink, then blue, rarely white; road-sides, common. *E. italicum*, L.; flowers smaller, white or light red, stem more branched; Southern Switzerland (rare), Pyrenees.

7. Pulmonaria, Tourn.

Flowers regular, in terminal cymes; corolla funnel-shaped, with five pencils of hairs between the stamens; stamens included.

P. officinalis, L., Lungwort; flowers pale purple, leaves ovate or ovate-lanceolate, acute, spotted with white; thickets; Southern Switzerland, Dauphiny, Pyrenees. *P. obscura*, Dumort.; leaves cordate-oblong, acuminate, twice as long as broad, spotted with white or not spotted, flowers much smaller; Switzerland. *P. angustifolia*, L. (*azurea*, Bess.); leaves narrowly lanceolate, spotted with

LXXXVIII.—MYOSOTIS ALPESTRIS.

pale green, flowers azure, corolla-tube glabrous within below the ring of hairs; thickets, local; Schaffhausen, Engadine, Tirol, Lombardy, Puy-de-Dôme, Pyrenees. *P. tuberosa*, Schr. (*vulgaris*, Mer.); leaves very rough, not spotted, inflorescence rough and bristly, corolla-tube pubescent below the ring of hairs; Eastern Switzerland (rare), Dauphiny, Pyrenees. *P. montana*, Lej. (*mollis*, Wolff); flowers violet, inflorescence covered with viscid glands, corolla-tube hairy below the ring of hairs, leaves soft with glandular hairs; Southern Switzerland, Pyrenees, rare.

8. Myosotis, L.

Flowers regular, small, blue, in terminal scorpioid cymes; corolla saucer-shaped, the throat closed by five scales alternate with the stamens; calyx-tube long.

All the English lowland species of Forget-me-not are found also in Switzerland, viz.:—*M. palustris*, With. (including *strigulosa*, Rchb.), the marsh species with large flowers; *M. versicolor*, Rchb., with large flowers, at first yellow, then dull blue, on dry banks; *M. sylvatica*, Hoffm., the wood species with large flowers; *M. cæspitose*, Schulz., the marsh species with small flowers; and the two small-flowered species found on dry banks in the very early spring, *M. arvensis*, Hoffm. (*intermedia*, Link), and *collina*, Hoffm. (*hispida*, Schlecht.). Also *M. stricta*, Link; under-side of the leaves covered with hooked hairs; fields in the south. The following are alpine:—*M. alpestris*, Schm. (Pl. 88); closely resembling *sylvatica*, stem 2–6 in., flowers crowded, at first reddish, then azure, corolla-tube entirely concealed by the calyx; common at high elevations. *M. pyrenaica*, Pourr.; flowers bright

blue, large, tube equalling the calyx in length, radical leaves forming a dense rosette; Pyrenees.

9. Eritrichium, Schrad.

Flowers regular, small, blue, in few-flowered cymes; corolla saucer-shaped, the throat closed by five small scales between the stamens; fruit with a membranous margin.

E. nanum, Schrad. (*terglovíense*, Kern.); stem 1–2 in., woolly, flowers 1–5, crowded into small cymes, resembling those of *Myosotis palustris*, leaves densely cæspitose, elliptical, woolly; alpine rocks, very high, not uncommon.

10. Cynoglossum, Tourn.

Flowers small, usually blue-purple, in bifurcate cymes, regular; corolla funnel-shaped, throat closed by prominent scales; nutlets 4, covered with hooked or barbed bristles. Not alpine.

C. officinale, L., Hound's-Tongue; leaves hoary with soft hairs; waste places, frequent. *C. montanum*, Lam. (*germanicum*, Jacq.); flowers blue, leaves thinner, not so hairy; mountain woods.

11. Echinospermum, Swartz.

Flowers regular, small, blue; corolla saucer-shaped, closed at the throat by five small scales; nutlets 4, triquetrous, bordered by several rows of barbed bristles.

E. Lappula, Lehm.; stem branched in the upper part, fruit-stalks erect, flowers in small extra-axillary clusters; waste places and walls; Switzerland, Pyrenees. *E.*

deflexum, Lehm.; stem branching from the middle or lower part, fruit-stalks deflexed; shady gorges; Oberland, Glarus, Valais, very rare.

12. Omphalodes, Tourn.

Flowers regular, large, bright blue; corolla rotate, throat closed by five scales; nutlets 4, depressed in a cavity of the receptacle. Not alpine.

O. verna, Mœnch.; flowers in small axillary or terminal few-flowered racemes, corolla twice as long as the downy calyx; Southern Tirol, Styria, Pyrenees.

13. Asperugo, L.

Flowers regular, small, blue, in axillary cymes; corolla funnel-shaped, throat closed by scales; calyx with five large leafy lobes, enlarged after flowering and concealing the fruit.

A. procumbens, L.; flowers 1 or 2 in the axils of the leaves, stem procumbent, prickly, leaves narrow, hispid; rubbish-heaps; Southern Switzerland, Pyrenees.

14. Heliotropium, L.

Flowers regular; corolla saucer-shaped, with five longitudinal folds at the throat; nutlets ovoid-triquetrous.

H. europæum, L., Heliotrope; flowers small, white or bluish, in dense axillary or oppositifoliar rolled-up cymes, calyx expanded in fruit, leaves whitish-green, pubescent; fields; Southern Switzerland, Jura, Pyrenees.

Borrago officinalis, L., Borage, is naturalised throughout Central and Southern Europe.

Order LIX.—SOLANACEÆ.

Flowers regular, in axillary or supra-axillary cymes; calyx 5-cleft, persistent, often enlarged in fruit; corolla 5-lobed; stamens 5, epipetalous; ovary 2- or incompletely 4-celled; seeds small, very numerous; fruit a berry or capsule. A large order, chiefly tropical, with very poisonous properties; no alpine species.

1. SOLANUM, Tourn.

Flowers solitary or in cymes; corolla rotate; anthers connate, opening by terminal pores; fruit a 2-celled berry.

S. Dulcamara, L., Bitter-Sweet; flowers violet, with large yellow anthers, in cymes opposite the leaves, stem weak, scrambling, berry red; hedges, common. *S. nigrum*, L. (including *miniatum*, Bernh., and *humile*, Mill.), an annual weed with small white flowers, and black, yellow, or red berry. *S. villosum*, Lam.; flowers larger, white, leaves pubescent, berry greenish-yellow; cultivated land.

2. PHYSALIS, L.

Flowers solitary; corolla rotate; calyx enlarged after flowering, and enveloping the 2-celled berry as a bladder.

P. Alkekengi, L., Winter Cherry; flowers pendant, solitary or in pairs, dirty white, envelope of berry at length red; hedges; Switzerland, Jura, Pyrenees.

3. ATROPA, L.

Flowers large, solitary or few, campanulate; stamens distinct; fruit a 2-celled berry; leaves entire.

LXXXIX.—RAMONDIA PYRENAICA.

A. Belladonna, L., Deadly Nightshade; a small shrub, stem 2–3 ft., flowers greenish-purple, 1 in. wide, berry black, very poisonous; thickets, occasional.

4. Hyoscyamus, L.

Flowers axillary or in scorpioid cymes; corolla bell-shaped; stamens distinct; fruit a 2-celled capsule, splitting horizontally (pyxis), enclosed in the persistent calyx.

H. niger, L., Henbane; fœtid and poisonous; flowers in a unilateral cyme, dull yellow veined with purple, stem-leaves amplexicaul, lobed or toothed; waste places in the South.

5. Datura, L.

Flowers large, funnel-shaped; seed-vessel a 4-valved capsule, bursting vertically, very spiny.

D. Stramonium, L., Thorn-Apple; flowers very large, usually white; waste places in the South.

Order LX.—GESNERACEÆ.

Flowers usually irregular; calyx 5-toothed; stamens usually 4, epipetalous; ovary superior, usually 1-celled, with parietal placentation and numerous ovules. A rather large order, chiefly tropical and American; represented in Europe by only a single species.

1. Ramondia, Rich.

Corolla regular; stamens 5; capsule 2-celled.

R. pyrenaica, Rich. (Pl. 89); flowers large, violet, solitary, or 2–3 on leafless scapes 2½–6 in. high, nod-

ding, corolla rotate, with a fringe of orange hairs in the centre, leaves all radical, large, oval, hairy, crenate, crinkled; damp shady rocks; Eastern and Central Pyrenees.

Order LXI.—SCROPHULARIACEÆ.

Calyx 5-lobed or bidentate, usually persistent; corolla usually very irregular, 4–5-lobed; stamens usually 4, epipetalous, 2 with longer, 2 with shorter filaments (didynamous), rarely 2; ovary 2-celled, style simple; ovules usually very numerous; seed-vessel a many-seeded capsule. A very large order, dispersed over the whole globe; some of the genera are parasitic.

1. Verbascum, L.

Flowers in simple or compound racemes; corolla nearly regular, 5-lobed, rotate, yellow; stamens 5, unequal, with bearded filaments; leaves usually woolly. Not alpine.

The species of Mullein are very difficult to define, owing to their frequent hybridisation. The following English species occur also in Switzerland:—*V. Thapsus*, L., Moses's Flannel, the commonest species, with very woolly decurrent leaves. *V. nigrum*, L.; leaves not woolly nor decurrent, lower stem-leaves cordate. *V. Blattaria*, L.; flowers in slender panicles, hairs of filaments purple, leaves nearly glabrous. *V. Lychnitis*, L.; flowers small, nearly white, hairs of filaments white, leaves tomentose beneath. *V. pulverulentum*, Vill. (*floccosum*, W. K.); flowers bright yellow, hairs of filaments white, stem and leaves mealy, flocculent. Also the fol-

XC. LINARIA ALPINA.

lowing:—*V. montanum*, Schreb.; resembling *Thapsus*, but flowers larger, filaments of all the stamens woolly, leaves not so strongly decurrent; hilly woods. *V. thapsiforme*, Schrad.; resembling *Thapsus*, but flowers much larger (1¼ in.), leaves more distinctly crenate and acuminate; Switzerland, Dauphiny, Pyrenees. *V. phlomoides*, L.; similar, but leaves not so strongly decurrent, tomentum yellow; rare.

2. Linaria, L.

Flowers axillary, solitary, or in racemes; corolla personate with a spurred tube; stamens 4; stigma notched or 2-lobed; capsule of two nearly equal cells, dehiscing by pores; lower leaves sometimes opposite or in whorls. Nearly all the species of Toadflax are lowland plants.

A. Flowers yellow, in racemes:—*L. vulgaris*, Mill; our common English Yellow Toadflax; hedge-banks, common (flowers sometimes regular, with 5 spurs and 5 stamens, var. *Peloria*). *V. italica*, Trev.; flowers smaller and paler, axis of raceme and flower-stalks glabrous; mountain valleys; Southern Switzerland, Styria, Dauphiny, Pyrenees. *L. supina*, Desf. (including *pyrenaica*, DC.); racemes short, stem glandular-pubescent, leaves linear, somewhat fleshy, the lower often in whorls, annual; sub-alpine; Piedmont, Dauphiny, Pyrenees. *L. simplex*, DC.; flowers very small, in short terminal racemes, leaves linear; Pyrenees.

B. Flowers purple or violet, in racemes:—*L. alpina*, Mill (Pl. 90); stem glabrous, somewhat prostrate, flowers in a loose raceme, violet with yellow throat, leaves linear, somewhat fleshy, in whorls of 4; high, frequent. *V. arvensis*, Desf.; annual, flowers very small,

flower-stalk and calyx glandular-pubescent, leaves linear, somewhat fleshy, the lower in whorls of 4; fields; Southern Switzerland (very rare), Pyrenees. *V. striata*, DC. (*repens*, Ait.); perennial, flowers larger, corolla striped with violet and yellow, or rarely white, spur sometimes wanting, flower-stalk glabrous, stem 1–3 ft.; Southern Switzerland (very rare), Lombardy, Dauphiny, Pyrenees. *L. Pelisseriana*, Mill.; annual, stem erect, 6–10 in., glabrous, leaves linear, often in whorls, seeds with a fimbriate wing; fields in the South. *L. origanifolia*, DC. (Pl. 91); perennial, stem partially decumbent, racemes short, leaves oblong or obovate, shortly stalked; Pyrenees.

C. Flowers purple or violet, axillary, usually solitary:—*L. Cymbalaria*, L., Ivy-leaved Toadflax, Mother of Thousands; perennial, stem prostrate, leaves 3–7-lobed, glabrous; walls and rocks. *L. minor*, Desf.; annual, flowers on long stalks, leaves linear-oblong, alternate; fields, common.

D. Flowers yellow, solitary, axillary:—*L. spuria*, Mill., a very hairy plant with ovate or orbicular leaves; and *L. Elatine*, Mill., a very hairy plant with hastate leaves, are annual weeds in cultivated land.

Several other species occur in cultivated land in the Pyrenean lowlands.

3. ANTIRRHINUM, Tourn.

Flowers axillary or in racemes; corolla personate, with a saccate tube; stamens 4; stigma shortly 2-lobed; capsule of two unequal cells, dehiscing by pores; leaves usually entire and alternate.

A. majus, L.; Snapdragon, Frog's-Mouth; flowers large, radical leaves lanceolate; walls (naturalised in Switzerland). *A. latifolium*, DC.; flowers yellow, leaves

XCI.—LINARIA ORIGANIFOLIA.

broader, leaves and stem covered with soft hairs; Piedmont, Dauphiny, Pyrenees. *A. sempervirens*, Lap.; flowers smaller, white or very pale yellow, on long stalks, leaves opposite, entire, stem much branched; rocks; Pyrenees. *A. Orontium*, L.; annual, flowers axillary, red; cultivated land.

4. Anarrhinum, Desf.

Corolla deeply 5-lobed, bilabiate, with a slender tube, throat open; stamens 4; capsule of 2 equal cells, each opening by a pore.

A. bellidifolium, Desf.; stem 8–24 in., flowers small, violet, in long spike-like racemes, radical leaves oblong-ovate, stem-leaves 5–7-partite; stony fields; Geneva, Lombardy, Piedmont, Dauphiny, Pyrenees.

5. Gratiola, L.

Calyx 5-partite, with two bracts at the base; corolla 4-lobed, irregular, 2-lipped, not spurred; stamens 2 or 4, two of them barren; capsule dehiscing by bifid valves. Not alpine.

G. officinalis, L.; flowers white or pink, axillary, solitary, on long stalks, leaves opposite, lanceolate, sessile, toothed; marshes; Switzerland, Jura, Dauphiny, Pyrenees.

6. Scrophularia, L.

Flowers in panicled cymes, small, greenish-purple, violet, or yellow; corolla 2-lipped, not spurred, tube ventricose; stamens 4, with a scale representing the 5th; stigma notched; capsule acute.

The two English species of Figwort, *S. nodosa*, L., with triangular-cordate doubly serrate leaves; and *aquatica*,

L. (including *Balbisii*, Hornem., *Ehrharti*, Stev., and *Neesii*, Wirtg.), occur similarly in wet places; also the following:—*S. canina*, L.; panicle with nearly sessile glands, upper lip of corolla one-third as long as tube, flowers black-purple mixed with white, stem nearly simple, leaves pinnatifid; stony places; Rhine Valley, Rhone Valley, Jura, Pyrenees. *S. Hoppei*, Koch; flowers violet, panicle with stalked glands, upper lip of corolla more than half as long as tube, leaves pinnate; dry, alpine, frequent. *S. vernalis*, L.; cymes on axillary peduncles, flowers greenish-yellow; hedge-banks; Switzerland (possibly introduced), Dauphiny, Pyrenees. *S. pyrenaica*, Benth.; flowers in stalked leafy axillary cymes, yellow, upper lip purple, leaves on long stalks, deeply incised, whole plant hairy; Pyrenees. *S. alpestris*, Gay; flowers in a leafless pyramidal panicle, purple, leaves pubescent, cordate, serrate; high; Pyrenees. *S. Scopoli*, Pers.; resembling the last, but leaves smaller, ovate, not cordate, less hairy; Carniola, Carinthia.

7. Erinus, L.

Flowers in short terminal leafless cymes; corolla saucer-shaped, nearly regular, with five emarginate lobes, violet; stamens 4; capsule curved.

E. alpinus, L. (Pl. 92); stem 2–5 in., leaves spathulate, strongly serrate in the upper part, cæspitose; alpine pastures, frequent.

8. Limosella, L.

Flowers very small, solitary, axillary; corolla 5-lobed, nearly regular; stamens 4; leaves very narrow. Cæspitose aquatic herbs.

XCII.—ERINUS ALPINUS.

L. aquatica, L.; flowers $\frac{1}{10}$ in., pink or white, leaves narrowly spathulate; marshy places, rare; Switzerland, Dauphiny, Pyrenees.

9. DIGITALIS, L.

Flowers in terminal racemes, large, purple or yellow, rarely white, usually spotted inside; corolla campanulate or ventricose, the margin scarcely lobed, bearded inside; stamens 4; stigma 2-lobed.

D. purpurea, L., Purple Foxglove; Vosges, Dauphiny, Pyrenees, wanting in Switzerland and Jura. *D. purpurascens*, Roth; corolla large, 1 in. long, reddish-yellow or light purple, tubular-campanulate, narrowed below, ciliate, leaves glabrous on both sides, serrulate; Vosges, Pyrenees. *D. grandiflora*, All. (*ambigua*, Murr.); corolla large, 1–1½ in. long, yellow spotted with brown inside, glandular-pubescent within, leaves pubescent on both sides; dry banks. *D. lutea*, L., Yellow Foxglove; corolla smaller, about ¾ in. long, yellow, not glandular, not spotted, leaves glabrous, ciliate; dry banks, more common.

10. WULFENIA, Jacq.

Flowers in terminal unilateral racemes; corolla ringent, spurred, not bearded; stamens 2, seated near the throat of the corolla-tube, filaments very short.

W. carinthiaca, Jacq.; stem erect, simple, 6–18 in., woolly below, with a few small leaves in the upper part, flowers violet-blue, crowded, radical leaves large, obovate-lanceolate, glabrous, coarsely toothed; Carinthia, very local (Kulweger and Watschiger Alps).

11. Pæderota, L.

Flowers in terminal unilateral racemes; corolla ringent, spurred, not bearded; stamens 2, seated at the base of the corolla-tube, beneath a row of hairs; stem leafy, leaves opposite. Alpine.

P. Ageria, L.; corolla pale yellow, the upper lip bifid, calyx and bracts green, stamens shorter than the corolla, stem erect, 4–6 in., leaves ovate-lanceolate, acute, serrate, glabrous; high, rocky; Tirol, Styria, Carniola, Carinthia. *P. Bonarota*, L.; corolla blue, upper lip usually entire, calyx and bracts purple, stamens longer than the corolla, stem 4–6 in., leaves broadly ovate, sessile, downy, coarsely toothed; high, stony; Tirol, Lombardy, Styria, Carniola, Carinthia.

12. Veronica, L.

Flowers in axillary or terminal racemes, rarely solitary, usually blue and small in European species; calyx 4-cleft; corolla rotate, 4-lobed, nearly regular; stamens 2, exserted, seated at the throat of the corolla-tube. Mostly lowland plants; but with many alpine species.

Of the common English species of Speedwell, the following are found also in Switzerland:—In woods, hedge-banks, and shady places:—*V. Chamædrys*, L., Germander Speedwell, with bright blue fugacious flowers in lax racemes; *V. montana*, L., resembling the last, but flowers paler, and leaves alternate instead of opposite; *V. officinalis*, L., with much smaller lilac flowers in a crowded spike. In marshes and by water-side:—*V. Beccabunga*, L., Brooklime, with bright blue flowers and broad serrate shining leaves; *V. Anagallis*, L., with lilac flowers, and

XCIII.—VERONICA SPICATA.

narrower serrate leaves; *V. scutellata*, L., with pink flowers and linear-lanceolate nearly entire leaves. Annual weeds in cultivated land:—*V. agrestis*, L., nearly glabrous, with pale blue flowers and ovate-cordate coarsely serrate stalked leaves; *V. polita*, Fr., similar, but flowers bright blue, and seeds more numerous; *V. persica*, Poir. (*Buxbaumii*, Ten.), resembling *agrestis*, but with much larger bright blue flowers, like those of *Chamædrys*; *V. hederæfolia*, L., very pubescent, with very small pale blue flowers, and broadly ovate 5–7-lobed leaves; *V. arvensis*, L., pubescent, with pale blue flowers, and ovate-cordate irregularly crenate-serrate leaves. On dry banks:—*V. serpyllifolia*, L., with small very pale flowers and thick glabrous ovate-lanceolate nearly entire leaves.

The following lowland annual weeds are found in Switzerland, but are rare or do not occur in this country:—*V. opaca*, L.; corolla dark blue, leaves dark green, nearly orbicular, with short hairs; rare; Western and Central Switzerland. *V. verna*, L.; stem erect, glandular-pubescent, leaves pinnatifid, bracts entire; grassy places. *V. triphyllos*, L.; stem erect, leaves palmately 3–7-lobed, bracts 3–5-fid; grassy places. *V. acinifolia*, L.; flowers light blue with yellow throat, stem glandular, leaves rather thick, slightly crenate; fields, rare. *V. præcox*, L.; flowers blue, stem erect, radical leaves somewhat cordate, deeply crenate; fields.

The following are perennial species, and mostly more or less alpine:—

A. Raceme simple, terminal:—*V. spicata*, L. (Pl. 93); stem 6–18 in. nearly leafless above, flowers bright blue, in a dense raceme, leaves opposite, lanceolate-ovate, crenate-serrate; dry hill-sides.

B. Racemes several, terminal:—*V. alpina*, L.; flowers small, bright blue, crowded, leaves broadly ovate, sessile, nearly entire, ciliate; alpine pastures, frequent. *V. bellidioides*, L.; resembling *alpina*, but the radical leaves larger, obovate, crowded into a rosette, whole plant more hairy, leaves entire; alpine pastures, frequent. *V. Townsendi*, Grml.; leaves fewer, dentate, raceme grandular, anthers white; Valais, rare. *V. aphylla*, L.; flowers light blue, in a very short corymbose raceme, inflorescence not glandular, very pubescent, stem 1–2 in., leafless, radical leaves crowded, ovate, ciliate; high, alpine, frequent. *V. fruticulosa*, L.; flowers large, light pink with darker veins, leaves opposite, ovate, sessile, nearly entire, glabrous, stem woody below, 6–9 in. high; alpine rocks; Switzerland, Jura, Pyrenees. *V. saxatilis*, Scop. (*fruticans*, Jacq.); flowers larger, ½ in. diam., bright blue with a purple ring at the base, leaves thick, elliptic, nearly entire, nearly glabrous; high alps; Switzerland, Jura, Vosges, Carpathians. *V. nummularia*, Gou. (Pl. 95); flowers bright blue, in a crowded sessile raceme, leaves small, very crowded, thick, glabrous, elliptic, lower part of stem often leafless; Pyrenees. *V. Ponæ*, Gou.; flowers violet, in a loose raceme, leaves large, oval, strongly serrate, stem 12–18 in.; Pyrenees.

C. Racemes axillary:—*V. urticæfolia*, L. (*latifolia*, L.); flowers violet, stem 1–2 ft., hairy, leaves opposite, distant, lanceolate, serrate; mountain woods, common. *V. nummularioides*, Lec.; flowers lilac or nearly white, stem 2–6 in., racemes many-flowered, somewhat elongated, glandular-hairy; Switzerland, rare. *V. Allionii*, Vill.; flowers large, very dark blue, in crowded racemes, leaves thick, coriaceous, ovate or obovate, nearly entire, glabrous; a

XCIV. VERONICA PROSTRATA.

very handsome plant; Dauphiny, Lombardy. *V. Teucrium*, L.; flowers large, bright blue, calyx 5-toothed, leaves ovate-lanceolate or cordate, sessile; grassy places, not uncommon. *V. prostrata*, L. (Pl. 94); calyx 5-toothed, flowers blue, stems slender, prostrate, branched, leaves linear-lanceolate; grassy slopes; Valais, Jura, Zürich. *V. austriaca*, L. (*dentata*, Schm.); resembling the last, but stem less branched, ascending; Neuchâtel, Styria, Carniola, Carinthia.

13. Melampyrum, L.

Flowers solitary, axillary, or in leafy spikes; calyx tubular or campanulate, 4-toothed; corolla 2-lipped, upper lip short, truncate; stamens 4, seated beneath the upper lip of the corolla, anthers hairy; leaves narrow, opposite; seeds 1–2 in each cell. Annual herbs, parasitic on roots, black when dry. Most species of Cow-wheat are lowland plants.

A. Flowers axillary:—*M. pratense*, L.; calyx-teeth as long as corolla-tube, corolla pale yellow, anthers reddish-brown, bracts toothed, leaves linear-lanceolate, sessile, entire; woods, common. *M. commutatum*, Tausch.; similar, but calyx-teeth longer than corolla-tube, anthers yellow; bushy, local. *M. sylvaticum*, L.; calyx-teeth triangular-lanceolate, spreading, shorter than corolla-tube, corolla bright yellow, bracts entire; mountain woods, common. *M. ericetorum*, Kern.; similar, but calyx-teeth as long as corolla-tube, lower lip of corolla folded, upper bracts toothed; high; Tirol. *M. nemorosum*, L.; corolla orange-yellow, calyx villous, bracts cordate, the upper ones violet; Vevey, Bienne, Savoy, Dauphiny, Pyrenees.

B. Flowers in spikes:—*M. arvense*, L.; corolla with yellow throat and purple lips, bracts pinnatifid at the base, spotted, leaves lanceolate; fields, local. *M. cristatum*, L.; spikes very dense, quadrangular, bracts ovate-cordate, finely pectinate, purple, corolla yellow tipped with purple, leaves linear-lanceolate; woods and fields, local.

14. Tozzia, L.

Flowers solitary in the axils of the upper leaves; calyx very short, tubular, 5-toothed; corolla 2-lipped, upper lip bifid, lower lip 3-cleft; leaves opposite, sessile.

T. alpina, L.; stem erect, square, scaly at the base, corolla golden-yellow with red spots on the lower lip, leaves ovate, crenate-dentate; moist alpine places, frequent.

15. Rhinanthus, L. (*Alectorolophus*, Wimm.).

Flowers yellow, in unilateral spikes, with broad bracts; calyx ventricose, compressed, 4-toothed, enclosing the seed-vessel like a bladder; corolla 2-lipped; stamens 4, concealed in the upper lip of the corolla; capsule compressed; seeds winged; leaves opposite, narrow, toothed. Annual herbs, parasitic on roots, black when dry.

R. Crista-galli, L. (*minor*, Ehrh.), Yellow Rattle; corolla-tube as long as calyx, lobes of upper lip short, leaves linear-oblong; damp meadows, common. *R. major*, Ehrh.; plant taller (1½–2 ft.), flowers larger, corolla-tube longer than calyx, lobes of upper lip elongated; damp pastures, frequent. *R. hirsutus*, Lam.; calyx and bracts very hairy; cultivated land, frequent. *R. alpinus*, Baumg.;

XCV.—VERONICA NUMMULARIA.

stem usually simple, corolla pale yellow, calyx spotted with black, bracts toothed, leaves oblong-lanceolate, crenate; high; Grisons, Valais, Canton de Vaud. *R. aristatus*, Celak.; stem usually branched, corolla yellow and blue, calyx not spotted, bracts with subulate teeth, leaves narrowly lanceolate, crenate; alpine pastures, frequent. *R. angustifolius*, Gmel.; similar, but a larger plant, with narrower leaves; alpine pastures.

16. Bartsia, L.

Flowers in spikes, with leafy bracts; calyx 4-toothed; corolla tubular, 2-lipped, upper lip arched; stamens 4, concealed under the upper lip; capsule elongated; leaves usually opposite. Herbs, parasitic on roots.

B. alpina, L.; flowers large, in the axils of purple bracts, dark purple-violet, anthers bearded, leaves ovate-serrate, upper ones amplexicaul, whole plant very hairy; alpine pastures, frequent. *B. spicata*, Ram.; spike not leafy, bracts linear-lanceolate, plant finely pubescent above; Pyrenees. *B. viscosa*, L. (*Eufragia viscosa*, Griseb.); flowers pale yellow, leaves ovate-lanceolate, sessile, coarsely serrate, whole plant glandular-viscid; meadows and pine-woods, rare; Valais, Piedmont, Dauphiny, Pyrenees. *B. lutea*, L.; flowers bright yellow, ringent, leaves linear-lanceolate, nearly entire, plant pubescent but not glandular; dry hills; Switzerland, Jura, Pyrenees. *B. Odontites*, Huds. (*Euphrasia Odontites*, L., including *serotina*, Lam., *divergens*, Jord., and *rubra*, Rchb.); flowers small, pink, stem branched, ending in slender leafy racemes, lower bracts leafy; moist waste places, common.

17. Euphrasia, L.

Flowers small, in unilateral bracteate spikes; calyx 4-toothed; corolla tubular, 2-lipped, upper lip concave; stamens 4, concealed by the upper lip, anthers hairy; capsule oblong; leaves opposite, lobed or incised. Small erect herbs, parasitic on roots.

A. Flowers white, usually dotted or streaked with violet, or dotted with yellow; leaves ovate or ovate-lanceolate, deeply serrate. The species of this section pass into one another, and are very difficult to distinguish:—*E. officinalis*, L., Eyebright, the English species, common. *E. Rostkoviana*, Hayne (*pratensis*, Fr.); flowers larger, corolla streaked with violet, lower lip with a yellow spot; dry banks, common. *E. hirtella*, Jord.; flowers smaller, corolla-tube enclosed in the calyx, leaves broad, stem rigid, plant densely hairy; meadows; Western and Southern Switzerland. *E. salisburgensis*, Funke; flowers small, leaves with deeply cut lobes at the base, narrower, glabrous; alpine pastures, frequent. *E. versicolor*, Kern.; flowers larger, tube of corolla projecting beyond the calyx-teeth, lower leaves cuneate; meadows, frequent. *E. alpina*, Lam.; flowers large, corolla white, often tinged with violet, stem not more than 1½–2 in., upper leaves broad with spreading teeth; pastures. *E. stricta*, Host.; stem 4–6 in., lobes of lower lip of corolla unequal, with a yellow spot; meadows. *E. pulchella*, Kern.; flowers large, lower lip white with yellow spots, upper blue-violet, leaves wedge-shaped, with a few teeth; Tirol. *E. montana*, Jacq.; closely resembling *officinalis*, but stem usually simple, leaves fewer, broader; damp mountain pastures.

B. Flowers white spotted with yellow and violet; leaves linear:—*E. tricuspidata*, L.; flowers large, leaves with one short tooth on each side; alpine pastures; Southern Tirol, Lombardy, Carniola, Carinthia.

C. Flowers usually entirely violet; leaves ovate or ovate-lanceolate:—*E. rigidula*, Jord. (*nemorosa*, Mart.); corolla purple-lilac, with curved tube, flowers in a lax spike, capsule deeply emarginate; alpine pastures. *E. ericetorum*, Jord.; closely resembling the last, but flowers somewhat larger, spikes denser, stem more branched; Valais, Geneva, Ticino. *E. pumila*, Kern.; corolla light violet with darker streaks, flowers in dense spikes, tube straight, stem not more than 2½ in., capsule not emarginate; pastures; Tirol.

D. Flowers very small, yellow, or upper lip tinted with violet:—*E. minima*, Jacq.; leaves ovate, toothed; alpine pastures, common.

18. PEDICULARIS, L.

Flowers large, red or yellow, usually in bracteate spikes or racemes; calyx tubular or campanulate, often inflated; corolla 2-lipped, sometimes dilated, upper lip often prolonged into a long beak; stamens 4, concealed in the upper lip of the corolla; leaves usually alternate and deeply divided. The Louseworts are erect herbs, parasitic on roots, turning black when dried; nearly all the species are alpine or sub-alpine.

A. Flowers yellow; upper lip of corolla drawn out to a narrow beak:—*P. elongata*, Kern. (Pl. 96); stem 6–12 in., few-leaved, nearly glabrous, spike elongated, calyx-teeth leaf-like, inciso-dentate, bracts pinnatifid, leaves

pectinate-pinnate; high pastures; South-Eastern Tirol, rare. *P. tuberosa*, L.; stem 4–6 in., densely woolly, spike short, umbel-like, calyx-teeth leaf-like, inciso-dentate, glabrous, leaves bipinnate; high, moist, frequent. *P. Barrelierii*, Rchb. (*ascendens*, Gaud.); spike long and lax, calyx-teeth lanceolate, entire; high; Switzerland, Dauphiny, rare

B. Flowers yellow; upper lip of corolla not prolonged into a long beak:—*P. Oederi*, Vahl (*versicolor*, Whlb.); upper lip of corolla with a dark purple spot, spike dense, stem about 3 in., leaves pectinate-pinnate, with crenate segments; Switzerland, Tirol, Styria, Piedmont, Bavaria, Carpathians. *P. foliosa*, L.; flowers large, sulphur-yellow, spike leafy, bracts leaflike, longer than the flowers, upper lip of corolla woolly, leaves pinnatifid, with irregularly incised segments; high, frequent. *P. Friderici-Augusti*, Tomm.; resembling *foliosa*, but flowers very light yellow, corolla with a ciliate ridge at the back; Mount Slavnik, Carniola. *P. Hacquetii*, Graf; flowers sulphur-yellow, spike 4–10 in. long, stem, leaves, and corolla glabrous; pastures; Tirol, Carniola, rare. *P. comosa*, L. (Pl. 97); flowers large, citron-yellow, spike elongated, dense, upper bracts lanceolate, entire, stem 6–9 in., downy, leaves pectinate-pinnate, with narrow incised segments; Southern Tirol (Monte Baldo), Dauphiny, Pyrenees.

C. Flowers red; corolla beaked; stem-leaves alternate:—*P. incarnata*, Jacq.; stem 9–24 in., leafy, flowers large, light red, spike long and lax, calyx-teeth nearly entire, calyx and bracts woolly, leaves pectinate-pinnatifid, glabrous, segments inciso-serrate; alpine pastures, frequent. *P. cenisia*, Gaud.; stem nearly leafless, spike

XCVII. PEDICULARIS COMOSA

very short, calyx-teeth pinnatifid; Great St. Bernard, Piedmont, Dauphiny. *P. asplenifolia*, Flör.; flowers few, pink, large, calyx-teeth nearly entire, with recurved tip, stem 1–3 in., leaves small, pinnatifid; high, moist; Grisons, Tirol, Styria, Carinthia, Salzburg. *P. rostrata*, L. (*Jacquini*, Koch); flowers large, few, pink, with a long darker beak, calyx-teeth glabrous, crenate, with a recurved leaf-like tip, stem 1–4 in., leaves pectinate-pinnate; high, moist, frequent. *P. Kerneri*, Dal. Tor.; beak of corolla shorter, stem more prostrate, leaves often with a calcareous incrustation; high, moist (very rare in Switzerland). *P. Portenschlagii*, Saut. (*geminata*, Port.); stem 1–3 in., flowers large, pink, few (spike 1–5 flowered), with a long tube and short recurved beak, calyx-teeth crenate, with recurved tip, leaves pectinate-pinnatifid, with linear-lanceolate segments; Jura, Tirol, Styria, Carinthia, Salzburg, Carpathians. *P. gyroflexa*, Gaud. (including *fasciculata*, Bell.); spike many-flowered, calyx-teeth pinnatifid, beak of corolla short, lower lip very small; Southern Switzerland, Jura, Southern Tirol, Piedmont, Dauphiny. *P. pyrenaica*, Gay (including *mixta*, Gren.); spike short, few-flowered, calyx glabrous, corolla-beak very long, corolla-tube bearded, bracts pinnatifid; Pyrenees.

D. Flowers red; corolla not beaked; stem-leaves alternate:—*P. sylvatica*, L., with nearly simple stem; and *palustris*, L., a larger branched plant, with larger flowers, are common English plants, the former in damp spots on heaths, the latter in bogs. The remainder are alpine or sub-alpine. *P. rosea*, Wulf.; flowers large, light pink, in a dense short spike, stem, bracts, and calyx woolly, stem often nearly leafless, leaves pectinate-pinnate, with

linear incised segments; alpine pastures (not in Switzerland). *P. recutita*, L.; stem 1–2 ft., glabrous, leafy, flowers dark red, in a long dense spike, calyx-teeth lanceolate, entire, ciliate, leaves pectinate-pinnatifid, with broad segments; high, moist, frequent. *P. atrorubens*, Schleich.; spike very dense, corolla dark purple-red, calyx-teeth broadly lanceolate, finely serrate; Great St. Bernard, Tirol, rare.

E. Flowers pink; stem-leaves in whorls:—*P. verticillata*, L.; stem simple, with a few whorls of 3–5 narrow pinnatifid leaves, flowers in crowded orbicular spikes, calyx inflated, corolla not beaked; alpine pastures, frequent.

F. Flowers pink; stem 0:—*P. acaulis*, Scop.; flowers very large, light pink, turning to red, shortly stalked, springing from the root-stock, calyx-teeth strongly dentate, leaves large, pinnate, with pinnatifid segments; bushy places, rare; Lombardy, Southern Tirol, Carniola.

19. Lathræa, L.

Leafless root-parasites; calyx 4-cleft; corolla 2-lipped, ringent; stamens 4.

L. squamaria, L., Toothwort; whole plant fleshy, yellowish-white or light purple, raceme unilateral, drooping; parasitic on the roots of hazel and other shrubs; occasional. *L. clandestina*, L.; stem 0, flowers in a few-flowered corymb; damp places in sub-alpine woods; Pyrenees.

Order LXII.—OROBANCHACEÆ.

Brown leafless root-parasites; stem usually simple; flowers in spikes or racemes; sepals 4–5; corolla 2-lipped; stamens 4, didynamous; ovary 1-celled; seeds numerous, minute. Widely distributed, chiefly in Southern Europe and Eastern Asia; not alpine.

1. OROBANCHE, L.

Characters of the Order. The numerous species of Broom-Rape are best characterised by the plant on the root of which they carry on a parasitic growth. The following species are recorded from Switzerland:—

O. minor, Sutt.; style violet; much the most common species; on various plants, very commonly on clover. *O. loricata*, Rchb.; style yellow; on *Artemisia campestris*; Valais. *O. Picridis*, Vauch.; whole plant very pale; on *Picris*. *O. Scabiosæ*, Koch; corolla yellow tinted with violet, covered with blackish tubercles; on *Scabiosa Columbaria*, and on species of *Carduus* and *Cirsium*. *O. epithymum*, DC. (*rubra*, Sm.); flowers scented, corolla reddish-brown, covered with small brown tubercles; on *Thymus*, not uncommon. *O. Teucrii*, Sch.; spike short, few-flowered; on *Teucrium* and *Thymus*. *O. caryophyllacea*, Sm. (*Galii*, Vauch.); plant yellow, flowers scented; on *Galium*. *O. Frölichii*, Rchb.; on *Petasites albus*; Appenzell. *O. flava*, Mart.; upper lip of corolla with reflexed lobes; on species of *Petasites*. *O. Hederæ*, Vauch.; spike elongated; on ivy, frequent. *O. Salviæ*, Sch.; corolla yellow; on *Salvia glutinosa*. *O. lucorum*, A. Br.; corolla brownish-yellow; on *Berberis*; Engadine,

Ticino. *O. Laserpitii Sileris*, Rap.; stem swollen at the base into a large ball, corolla brownish-yellow streaked with violet; on *Laserpitium Siler*; Jura, Salève, Bern. *O. elatior*, Sutt.; plant yellow, corolla reddish-brown; on *Centaurea Scabiosa*. *O. Cervariæ*, Suard.; corolla fawn-coloured tinted with violet, sepals distinct; on various Umbelliferæ. *O. rubens*, Wallr.; corolla reddish-brown, sepals 2–3-cleft; on various Leguminosæ, rare. *O. major*, L. (*Rapum*, Thuill.); tall, coarse, with large brown flowers; on Leguminosæ, frequent. *O. cruenta*, Bert.; smaller, corolla yellowish; on Leguminosæ. *O. cærulea*, Vill.; whole plant blue-purple, anthers glabrous; on *Achillæa millefolium*. *O. arenaria*, Berk.; similar, but anthers hairy; on *Artemisia campestris*; Vaud, Valais. *O. ramosa*, L.; stem branched; on tobacco and hemp.

The following additional species are recorded from the Pyrenees:—*O. cæsia*, Rchb.; bracts woolly; on *Artemisia gallica*. *O. variegata*, Wallr.; flowers yellow veined with brown and purple; on Leguminosæ. *O. speciosa*, DC.; whole plant scaly; on *Vicia Faba*. Also *O. amethystea*, Thuill.; whole plant violet, bracts linear-lanceolate; on *Eryngium campestre* and other plants; Piedmont; and many other species in the South of France and North of Italy.

Order LXIII.—LENTIBULARIACEÆ.

Flowers solitary or in racemes; calyx persistent, 2-lipped or 5-toothed; corolla 2-lipped, with short tube; ovary 1-celled, stigma 2-lipped; ovules numerous, on a free central placenta. A small order of aquatic or

XCVIII PINGUICULA ALPINA

bog plants with insectivorous habit, belonging to the colder parts of the globe.

1. PINGUICULA, Tourn.

Flowers solitary, on leafless stalks; corolla ringent, spurred; calyx unequally 5-cleft; stem 0; leaves all radical, in rosettes, succulent, entire, with incurved margin and numerous capitate glands. The species of Butterwort are all bog plants. The glands on the upper surface of the leaves exude a viscid secretion, by which insects are detained, and the softer parts of their bodies digested, as in a stomach.

P. vulgaris, L.; corolla violet, with a long spur, calyx-teeth obovate-lanceolate, spreading, leaves ovate-lanceolate, very succulent; bogs, especially at a high elevation, common. *P. longifolia*, Ramb. (*leptoceras*, Rchb.); similar, but flowers rather smaller, leaves narrowly lanceolate; bogs. *P. grandiflora*, Lam.; flowers larger than in *vulgaris*, leaves ovate-lanceolate, calyx-teeth obovate or nearly orbicular, touching; bogs; Alps, Jura, Pyrenees. *P. alpina*, L. (Pl. 98); corolla white with yellow spots on the lower lip, spur short, conical; alpine bogs and wet rocks, not uncommon.

2. UTRICULARIA, L.

Flowers solitary or in spikes or racemes, yellow; calyx 2-partite; corolla personate; leaves (in the European species) divided into linear segments and furnished with minute bladders. All the European species of Bladderwort are aquatic plants with submerged leaves and handsome flowers appearing above the surface of the water.

The pitcher-like bladders with which the leaves are provided capture water animalcules, which are then consumed and digested as in a stomach.

The four British species:—*U. minor*, L., flowers light yellow, leaf-segments denticulate-spiny, spur of corolla minute; *U. vulgaris*, L., flowers dark yellow, upper lip of corolla about as long as palate, spur conical; *U. neglecta*, Lehm., upper lip of corolla two or three times as long as palate; and *U. intermedia*, Heyne, spur conical, acute, bladders on separate branches; also *U. Breemii*, Heer, resembling *minor*, but lower lip of corolla flat; all in marshes and swamps.

Order LXIV.—GLOBULARIACEÆ.

Flowers small, in dense terminal umbels, surrounded by an involucre; calyx 5-cleft; corolla 4–5-cleft, obscurely 2-lipped; ovary 1-celled with a single pendulous ovule. A small order, belonging almost entirely to the extra-tropical Eastern hemisphere.

1. GLOBULARIA, L.

Flowers in dense globular umbels, blue; calyx 4-cleft, with linear teeth; stamens 4, nearly equal in length; stigma simple, capitate. Alpine.

G. cordifolia, L.; stem 1–2½ in., leafless, with barren prostrate leafy shoots, leaves small, obcordate, a very cæspitose plant; alpine pastures, frequent. *G. nudicaulis*, L.; stem 2–6 in., nearly leafless, with no barren shoots, leaves large, 3–4 in. long, obovate-lanceolate; alpine pastures; Switzerland, Dauphiny, Pyrenees. *G.*

XCIX.—GLOBULARIA NANA.

Willkommii, Nym. (*vulgaris*, auct.); stem leafy; hill-sides; Switzerland, not uncommon. *G. nana*, Lam. (Pl. 99); densely cæspitose, umbels nearly sessile, leaves very small and narrow; Pyrenees.

Order LXV.—VERBENACEÆ.

Flowers usually in cymes; calyx usually 5-toothed; corolla irregular, often 2-lipped; stamens usually 4, didynamous; ovary 2–4-celled. A very large order, chiefly of tropical and sub-tropical trees and shrubs, represented in Europe only by a very small number of species; not alpine.

1. VERBENA, L.

Flowers in terminal bracteate spikes or racemes; calyx 5-toothed; corolla 2-lipped; ovary 4-celled; leaves usually opposite.

V. officinalis, L., Vervain; road-sides and waste places, very common; almost always near houses.

Order LXVI.—LABIATÆ.

Flowers solitary, or in opposite, axillary, crowded, stalked or sessile cymes, having the appearance of whorls; calyx persistent, 5-cleft; corolla 2-lipped; stamens 4, epipetalous, didynamous, rarely only 2; ovary of two connate deeply 2-lobed carpels; style 1; stigma forked into two arms, and not mature till a considerably later period than the maturity of the stamens in the same flower (proterandrous); fruit of four 1-seeded nut-

lets; stem always square; leaves always opposite and decussate, often glandular and fragrant. A very large order, belonging chiefly to the Temperate Zone.

1. Mentha, L.

Flowers small, in dense axillary cymes, often combined into leafy spikes; corolla-tube short, limb 4-lobed; stamens nearly equal; whole plant usually strongly fragrant. Not alpine.

The Swiss species of Mint are the same as the English, viz.:—In wet places, road-sides, &c.:—*M. sylvestris*, L. (including *nemorosa*, Willd.), Horse-mint; with whorls in terminal spikes and obovate or lanceolate leaves; *M. rotundifolia*, L.; similar, but leaves nearly round, shaggy; *M. piperita*, Huds., Pepper-mint; very strongly scented, with glabrous stalked leaves; *M. aquatica*, L.; with softer leaves, and very crowded whorls; very common; *M. sativa*, L. (including *rubra*, Sm., *gracilis*, Sm., *pratensis*, Sol., and *gentilis*, L.); distinguished from the last by the inflorescence being more concealed in the leaves. In cultivated land:—*M. arvensis*, L.; a very hairy prostrate plant; very common; *M. Pulegium*, L., Penny-royal; a smaller plant, whorls quite distinct, calyx 2-lipped. Other forms described are probably hybrids.

2. Lycopus, L.

Flowers small, in dense axillary sessile cymes; calyx nearly regular, 4–5-toothed; corolla nearly regular; stamens 4, two of them imperfect. Not alpine.

L. europæus, L., Gipsy-wort; stem 2–3 ft., flowers very small, white dotted with purple; wet places.

3. ORIGANUM, Tourn.

Flowers small, crowded, in corymbose cymes; calyx regular; corolla obscurely 2-lipped; stamens 4, perfect; plant very fragrant. Not alpine.

O. vulgare, L., Marjoram; open hill-sides, especially calcareous.

4. THYMUS, L.

Flowers small, in few-flowered axillary cymes, often unisexual; calyx 2-lipped; corolla obscurely 2-lipped; stamens 4, perfect, very unequal; leaves small, entire; stem procumbent; plant very fragrant.

T. Serpyllum, L. (including *pannonicum*, All.), Wild Thyme; frequent. *T. Chamædrys*, Fr.; more cæspitose, branches square, cymes forming a spike; the more common species in the Alps. *T. vulgaris*, L., Garden Thyme; flowers larger, stem more erect, edges of leaves revolute; Pyrenees, doubtfully wild in Southern Switzerland.

5. CALAMINTHA, Mœnch.

Axillary cymes usually few-flowered, generally stalked; calyx tubular, 2-lipped; corolla with a long straight tube, 2-lipped, upper lip erect, lower lip spreading, 3-lobed; stamens 4.

A. Flowers red-purple: — *C. Clinopodium*, Benth. (*Clinopodium vulgare*, L.), Wild Basil; flowers numerous, in dense nearly sessile cymes, surrounded by numerous ciliate bracts, leaves pubescent; copses, common. *C. officinalis*, Mœnch., Calamint; flowers 5–15 in stalked cymes, calyx-teeth very unequal; thickets. *C. menthæfolia*, Host. (*ascendens*, Jord.); very similar, but with

smaller paler flowers, and cymes on shorter stalks; thickets. *C. Nepeta*, Sav.; similar, but cymes denser, stem more branched, leaves crenate instead of serrate; Ticino. *C. nepetoides*, Jord.; very similar, but a more hairy plant, with smaller nearly entire leaves; Southern Switzerland, Dauphiny, Pyrenees. *C. grandiflora*, Mœnch.; flowers much larger (1 in. long), 3–5 in stalked cymes, leaves deeply serrate; mountain woods; Southern Switzerland, Dauphiny, Pyrenees.

B. Flowers blue-purple or violet:—*C. Acinos*, Clairv. (*Thymus Acinos*, L.), Basil Thyme; flowers small, spotted, leaves pubescent, stalked, nearly entire; dry stony fields. *C. alpina*, L.; flowers larger, violet with white throat, leaves small, ovate, serrate, calyx downy, open; dry alpine slopes.

6. Horminum, L.

Flowers large, reddish-violet, in few-flowered cymes, forming a terminal spike on a nearly leafless scape; corolla-tube long, with a hairy ring, upper lip truncate; leaves mostly radical, forming a rosette. Alpine.

H. pyrenaicum, L. (Pl. 100); radical leaves large, coarse, ovate-elliptical, crenate, glabrous, stem 4–8 in.; alpine pastures, frequent.

7. Satureja, L.

Calyx campanulate, 5-toothed, not 2-lipped; corolla 2-lipped, upper lip flat; stamens 4.

S. montana, L.; flowers white spotted with pink, leaves shining, coriaceous, entire, stem woody, 8–18 in., plant fragrant; rocks; Carniola, Dauphiny, Pyrenees.

C.—HORMINUM PYRENAICUM

8. Micromeria, Benth.

Cymes few-flowered, on short stalks, unilateral; calyx cylindrical, 5-toothed, not 2-lipped; corolla 2-lipped, lower lip of three nearly equal lobes; stamens 4.

M. Piperella, Benth. (Pl. 101); cymes 1–3-flowered, flowers red-purple, corolla with a very long slender tube, leaves small, ovate, sessile, glabrous; Piedmontese Alps. *M. græca*, Benth.; cymes 2–10-flowered, flowers pink, lower leaves oval, upper linear-lanceolate; Ticino, very rare.

9. Salvia, L.

Cymes collected into a leafy spike or raceme; calyx and corolla 2-lipped; stamens 2, connective long and slender, bearing at its two ends one perfect and one abortive anther-lobe; plant often very fragrant. The peculiar structure of the stamens in the various species of Sage is a remarkable contrivance for cross-pollination. An insect entering the flower in search of honey strikes against the barren anther-lobe, and thus empties on to its back the pollen out of the perfect lobe. At this time the style is very short and the stigmas then immature (proterandrous). At a later period the style has elongated greatly, and the two stigmas project out of the corolla. When the insect visits another flower in this condition, the pollen which was lodged on its back is caught by and deposited on the projecting stigma, and the ovules are thus cross-fertilised.

A. Flowers yellow: — *S. glutinosa*, L.; cymes 2–3-flowered, flowers very large, dirty yellow, upper lip of calyx entire, leaves cordate-hastate, pubescent; mountain woods, frequent.

B. Flowers blue or violet:—*S. Sclarea*, L., Sage; very fragrant, flowers very large, variegated with violet and white, bracts very large, red or violet; dry hills and vineyards; doubtfully wild in Southern Switzerland. *S. pratensis*, L., flowers large (about 1 in.), bright blue, bracts small, green, upper lip of corolla long, arched, viscid; dry banks and road-sides, common. *S. verticillata*, L.; flowers small, light blue, leaves cordate-triangular, often auricled; road-sides, occasional.

10. Nepeta, L.

Cymes axillary or terminal; calyx 5-toothed; flowers small; corolla 2-lipped, middle lobe of lower lip large, upper lip truncate; stamens 4.

N. Cataria, L., Cat-mint; flowers about ½ in., white spotted with purple, stem branched, leaves cordate-ovate, inciso-serrate, white and pubescent beneath; banks, occasional. *N. nuda*, L.; flowers small, white or violet, stem much branched, leaves cordate-oblong, pubescent, green on both sides; rocky places; Southern Switzerland, Tirol, Piedmont, Dauphiny, Pyrenees. *N. lanceolata*, DC. (*Nepetella*, All.); strongly scented, flowers white, calyx-teeth lanceolate-subulate, leaves lanceolate or linear-lanceolate; high; Southern Switzerland, Dauphiny, Pyrenees. *N. Glechoma*, Benth. (*Glechoma hederacea*, L.), Ground Ivy; flowers blue; everywhere.

11. Dracocephalum, L.

Flowers large, violet; cymes axillary, collected into terminal spikes; calyx 2-lipped, 5-toothed; corolla ringent; stamens 4. Alpine.

D. Ruyschiana, L.; leaves linear-lanceolate, undivided, entire, stem erect, 4–12 in.; alpine pastures; Southern

CI.—MICROMERIA PIPERELLA.

Switzerland, Southern Tirol, Piedmont, Dauphiny, Pyrenees, local. *D. austriacum*, L.; cymes in an interrupted spike, leaves pinnate, with 3–7 linear mucronate segments, stem 8–12 in.; rocky places; Grisons, Valais, Tirol, Dauphiny, Carpathians, Pyrenees, rare.

12. Melittis, L.

Cymes few-flowered; flowers large, white spotted with pink or purple; calyx broadly campanulate with rounded lobes; corolla-tube broad, orbicular; stamens 4; lobes of style ovate. Not alpine.

M. Melissophyllum, L.; flowers very large (about 1½ in.), often solitary, leaves cordate-oval; woods; Switzerland, Dauphiny, Pyrenees.

13. Lamium, L.

Cymes many-flowered, sessile; upper lip of corolla arched, lower lip spreading; stamens 4; anthers hairy. Not alpine.

All the English species are found in Switzerland, viz.: —*L. album*, L., White Dead-Nettle; common. *L. purpureum*, L., Purple Dead-Nettle; and its sub-species *hybridum*, Vill. (*L. incisum*, Willd.), with more deeply incised leaves; common. *L. maculatum*, L.; flowers large, light pink, leaves usually with white stripes; common. *L. amplexicaule*, L.; flowers very small, pink, usually closed, leaves orbicular-reniform, amplexicaul; cultivated land. Also *L. longiflorum*, Ten.; flowers large, purple, corolla-tube much dilated, leaves stalked, cordate-ovate, doubly crenate; high; Piedmont. *L. Galeobdolon*, Crantz. (*Galeobdolon luteum*, Huds.), Yellow Archangel; flowers yellow; woods, common.

14. Ballota, L.

Cymes many-flowered, dense; calyx-teeth 5–10, spreading; corolla-tube with a ring of hairs inside, upper lip erect; stamens 4. Not alpine.

B. nigra, L. (including *alba*, L., *fœtida*, Lam.), Stinking Horehound; very fœtid; hedge-banks, very common.

15. Prunella,* L.

Cymes few-flowered, in dense terminal heads, surrounded by orbicular leaf-like bracts; calyx closed in fruit; upper lip of corolla flat, lower lip 2-lobed; stamens 4, filaments bifid. Not alpine.

P. vulgaris, L., Self-heal, Heal-all; very common. *P. alba*, Pall. (*laciniata*, L.); flowers yellowish-white, leaves pinnatifid; dry banks; Southern and Western Switzerland, Dauphiny, Pyrenees, local. *P. grandiflora*, Jacq.; flowers large, purple (¾–1 in.), stem less leafy than *vulgaris*; banks and meadows, common.

16. Scutellaria, L.

Flowers solitary or in pairs, axillary, purple or violet; calyx 2-lipped, closed after flowering; corolla-tube long, not hairy inside, upper lip helmet-shaped, lower lip 3-lobed; stamens 4.

S. galericulata, L., Skull-cap; flowers blue, about ⅔ in., stem 6–18 in., branched, leaves ovate-lanceolate, glabrous; water-sides. *S. hastifolia*, L.; flowers violet, cymes in a terminal leafy spike, leaves ovate or lanceolate-hastate, glabrous; Rhone Valley. *S. alpina*, L. (Pl. 102);

* Continental botanists spell this word *Brunella*.

CII. SCUTELLARIA ALPINA.

flowers very large, violet with yellowish-white lower lip, solitary in the axils of ovate membranous bracts, forming a dense terminal spike; alpine pastures, rare; South-Western Switzerland, Piedmont, Dauphiny, Pyrenees.

17. LEONURUS, L.

Flowers small, pink or white, in dense axillary cymes; calyx turbinate, truncate, with five triangular spreading teeth; corolla 2-lipped, upper lip entire; stamens 4. Not alpine.

L. Cardiaca, L., Mother-wort; flowers pink, upper lip of corolla villous, stem 2–4 ft., very leafy, lower leaves palmatifid, upper 3-lobed; waste places.

18. MARRUBIUM, L.

Flowers small, in dense cymes in the axils of leaf-like bracts; calyx tubular, 5–10-toothed; corolla short, upper lip erect; stamens 4. Not alpine.

M. vulgare, L., Horehound; strongly fragrant, flowers white, leaves thick, cordate-ovate, wrinkled, hoary like the stem; waste places.

19. SIDERITIS, L.

Cymes forming an elongated spike; corolla 2-lipped; calyx-teeth ending in spines; stamens 4.

S. hyssopifolia, L.; spike short, ovoid, continuous; flowers pale yellow; leaves elliptical or linear-lanceolate, nearly entire, stem woody, 4–12 in.; rocky places; Jura, Piedmont, Dauphiny, Pyrenees.

20. Stachys, L.

Cymes few-flowered, forming elongated terminal spikes or racemes; calyx-teeth nearly equal; corolla-tube cylindrical, lateral lobes of lower lip often reflexed; stamens 4.

A. Flowers pink or purple:—*S. sylvatica*, L., Wound-wort; fœtid, flowers red spotted with white; woods, common. *S. palustris*, L.; leaves lanceolate, sessile, flowers light pink; wet places, common. *S. ambigua*, Sm., is probably a hybrid between these two. *S. germanica*, L.; stem and leaves shaggy with silky hairs, lower leaves cordate, crenate-serrate, flowers pale pink; stony places; Southern Switzerland, Dauphiny, Pyrenees. *S. arvensis*, L.; flowers very small, pink and white; a small annual weed in cultivated ground. *S. alpina*, L.; stem erect, glandular-hairy above, leaves broadly ovate, flowers dark purple; mountain woods.

B. Flowers yellow:—*S. recta*, L.; cymes few (3–5-flowered), forming an elongated spike, calyx-teeth ending in a short spine, leaves lanceolate, hairy, stems 8–18 in.; stony places, frequent. *S. annua*, L.; leaves oblong-lanceolate, nearly glabrous, bracts lanceolate; an annual weed in cultivated land.

21. Betonica, L.

Resembling *Stachys*, but cymes in dense short terminal spikes.

B. officinalis, L. (*Stachys Betonica*, Benth.), Wood-Betony; flowers pink, upper leaves narrowly lanceolate; woods, common. *B. hirsuta*, L.; flowers purple, much larger, calyx twice as long, net-veined, stamens as long

as upper lip of corolla, stem hairy; alpine meadows; Western Switzerland, Carniola, Dauphiny, Pyrenees. *B. Alopecuros*, L.; flowers pale yellow, leaves cordate-ovate, coarsely serrate, hairy like the stem, stamens much shorter than upper lip of corolla; alpine pastures, frequent.

22. GALEOPSIS, L.

Cymes dense, many-flowered, axillary and terminal; bracts foliaceous; calyx nearly regular, 5-toothed, teeth ending in spines; corolla-tube straight, upper lip arched, middle lobe of lower lip bifid or obcordate; stamens 4, exserted. Not alpine.

A. Flowers red or pink:—*G. Tetrahit*, L., Hemp-Nettle; leaves ovate-lanceolate, stalked, coarsely serrate, hispid, stem hispid, swollen at the nodes; cultivated land, common. *G. Ladanum*, L. (including *angustifolia*, Ehrh., and *intermedia*, Vill.); leaves narrower, on shorter stalks, pubescent, stem not thickened at the nodes; fields, common. *G. pubescens*, Bess.; flowers bright purple, tube longer than calyx-teeth, leaves oval, stem thickened at the nodes; road-sides, rare; Chur, Bregenz. *G. bifida*, Bönn.; resembling *Tetrahit*, but softer, flowers smaller, middle lobe of lower lip 4-cornered; rare; Constance, St. Gallen, Schwyz, Thun. *G. pyrenaica*, Bartl.; cymes forming a broad panicle, flowers larger, calyx covered with white glandular hairs, leaves oval, obtuse, crenulate, tomentose; Pyrenees.

B. Flowers yellow or variegated:—*G. dubia*, Leers. (*ochroleuca*, Lam.); flowers large (1–1¼ in.), whole plant glandular-pubescent; fields, occasional. *G. speciosa*, Mill. (*versicolor*, Curt.); flowers as in the last, whole

plant hispid, stem thickened at the nodes; rocky places, occasional. *G. sulfurea*, Jord.; Dauphiny; scarcely differs.

23. Ajuga, L.

Upper lip of corolla very short, notched, lower lip 3-lobed, spreading; stamens 4, protruding beyond the upper lip.

A. reptans, L., Bugle; flowers blue, plant glabrous, furnished with long leafy stolons, leaves ovate or obovate, crenate; very common. *A. alpina*, Vill., with shorter or no stolons, flowers violet, is an alpine form of this. *A. pyramidalis*, L.; no stolons, flowers blue, bracts very large, coloured, cymes forming a pyramidal spike, lower leaves very large, cæspitose; alpine pastures, frequent. *A. genevensis*, L.; no stolons, flowers bright blue, radical leaves evanescent, bracts coarsely dentate-crenate; mountain pastures; Switzerland, Jura. *A. Chamæpitys*, Schreb., Ground-Pine; flowers small, yellow, solitary, bracts yellow, leaves deeply 3-fid, with linear lobes; a small annual weed in calcareous soil; rare.

24. Teucrium, L.

Cymes forming leafy unilateral spikes or racemes; calyx 5-toothed, the upper teeth often broader and reflexed; corolla short, upper lip very small, 3-partite, lateral lobes of lower lip large; stamens 4.

A. Flowers red or pink:—*T. Chamædrys*, L.; stem woody below, 6–18 in., leaves ovate, stalked, inciso-crenate; dry banks, frequent. *T. Scordium*, L.; flowers in pairs in the axils of the upper leaves, leaves ovate, sessile, crenate, soft, stem 4–8 in., branched; wet places,

CIII.—TEUCRIUM PYRENAICUM.

occasional. *T. Botrys*, L.; annual, plant glandular-villous, leaves doubly pinnatifid, calyx saccate at the base; cultivated land, frequent. *T. lucidum*, L.; cymes 2–3-flowered, forming an elongated leafy unilateral spike, calyx glabrous, leaves inciso-dentate, glabrous; Dauphiny.

B. Flowers yellow or variegated:—*T. Scorodonia*, L., Wood-Sage; very fragrant, flowers small, greenish-yellow, leaves ovate-cordate, crenate, stalked; woods, very common. *T. montanum*, L.; flowers yellowish-white, in crowded terminal heads, leaves linear-lanceolate, entire, tomentose beneath; dry mountain-sides, frequent. *T. pyrenaicum*, L. (Pl. 103); flowers large, upper lip purple, lower lip yellow, cymes in dense terminal heads, lower lip of corolla toothed, stems several, 4–8 in., leaves nearly orbicular, deeply crenate; rocky; Dauphiny, Pyrenees. *T. aureum*, Schreb.; flowers golden-yellow, tomentose, calyx and leaves very hairy, leaves sessile, oblong, crenate, upper ones often yellow; Dauphiny, Provence.

Order LXVII.—PLANTAGINACEÆ.

Flowers small, bisexual or unisexual, in crowded spikes on leafless scapes; sepals 4; corolla 4-lobed, very inconspicuous; stamens 4, with large exserted anthers; ovary superior, 2–4-celled, with a single ovule in each cell; stigma feathery; fruit a 1–4-celled capsule. A very small order, belonging to the Temperate parts of the globe.

1. PLANTAGO, L.

Flowers bisexual; stamens epipetalous; capsule a pyxis splitting horizontally; seeds with a mucilaginous testa.

The three familiar English species of Plantain or Rib-Grass, *P. major*, L., *lanceolata*, L., and *media*, L., are equally abundant in Switzerland, in meadows and by road-sides. The following also occur:—*P. alpina*, L.; scape 2–6 in., spike oblong-cylindrical, corolla-tube hairy, leaves linear, 3-nerved; alpine pastures. *P. serpentina*, Vill.; scape 6–12 in., spike elongated, cylindrical, leaves thick, glaucous, root-stalk elongated; Southern Switzerland, Jura, Tirol; rare. *P. montana*, Lam.; scape 3–6 in., spike few-flowered, corolla-tube glabrous, leaves lanceolate or linear-lanceolate, glabrous, many-nerved; pastures; Switzerland, Jura, Dauphiny, Pyrenees. *P. fuscescens*, Jord.; scape 3–6 in., spike many-flowered, with large bracts, leaves lanceolate or linear-lanceolate, many-nerved, silky; rare; Zermatt, Louèche, Tirol, Piedmont, Dauphiny. *P. arenaria*, W. K.; stem prostrate, scapes in the axils of stem-leaves; very rare; Geneva. *P. Cynops*, L.; stem woody, with axillary scapes; Switzerland, rare (Freiburg), Jura, Dauphiny, Pyrenees. *P. argentea*, Chaix; spike very dense, nearly globular, stem 8–16 in., bracts acuminate, leaves linear-lanceolate, covered on both sides by silky hairs; alpine rocks; Dauphiny. *P. monosperma*, Pourr.; resembling the last, but spike more elongated, not so dense, bracts oval; high valleys; Pyrenees.

2. Littorella, L.

Flowers unisexual; female flowers in few-flowered spikes; male flowers solitary; stamens hypogynous. Aquatic herbs.

L. lacustris, L.; filaments very long and slender; wet places, occasional.

Order LXVIII.—ILLECEBRACEÆ (*Paronychiaceæ*).

Flowers very small, usually bisexual; sepals 4–5, petals very minute or 0; ovary superior, 1-celled, with one ovule; leaves entire. A very small order of inconspicuous cæspitose herbs.

1. CORRIGIOLA, L.

Leaves alternate, with scarious stipules; petals 5, small, white; stigmas 3; stamens 5. Not alpine.

C. littoralis, L.; stem prostrate, spreading, leaves linear-oblong; sandy places, very rare; Bâle, Geneva, Pyrenees.

2. HERNIARIA, L.

Leaves opposite or alternate; flowers axillary, minute; sepals 4–5, green; petals 4–5, green, setaceous, minute, or 0; stamens 3–5; stigmas 2.

H. alpina, L.; leaves obovate, ciliate, flowers 1–3 in axillary clusters, calyx hairy; high pastures, frequent. *H. glabra*, L.; leaves oblong, glabrous or ciliate, calyx glabrous, flowers more numerous; sandy places. *H. hirsuta*, L.; calyx and leaves very hairy, flowers somewhat larger; sandy places.

3. ILLECEBRUM, L.

Leaves opposite; flowers in crowded axillary clusters; sepals 5, white; petals 5, very minute, setaceous; stamens 5, hypogynous; stigmas 2. Not alpine.

I. verticillatum, L.; stem prostrate, branched, leaves

ovate or obovate; damp sandy places, very rare; Ticino, Lombardy, Pyrenees.

4. Telephium, L.

Leaves alternate; sepals 5; petals 5, white, as long as the sepals; stamens 5, styles 3. Not alpine.

T. Imperati, L.; flowers white, in crowded clusters at the ends of the branches; stem leafy, leaves ovate, glaucous; rocky places, rare; Valais, Pyrenees.

5. Scleranthus, L.

Leaves opposite, connate; calyx funnel-shaped, 4–5-lobed, green; petals 0; stamens 5, hypogynous; stigmas 2. Erect weeds in cultivated land; not alpine.

S. perennis, L.; perennial, calyx-lobes with broad white margin; and *S. annuus*, L.; annual (as the rest), calyx-lobes with narrow membranous margin, flowers axillary; both very common. *S. verticillatus*, Tausch.; flowers smaller, calyx-lobes almost without a membranous margin; grassy places. *S. collinus*, Horng.; flowers in clusters at the joints of the stem, stem not much branched; open hill-sides.

Class IV.—MONOCHLAMYDEÆ or INCOMPLETÆ.

Corolla wanting or petals very minute; flowers usually unisexual, and either monœcious or dicœcious, generally inconspicuous. Orders LXIX.—LXXXIII.

Order LXIX.—AMARANTHACEÆ.

Flowers small, unisexual or bisexual, surrounded by dry scarious bracts which are often coloured, and collected into dense spikes; stamens 3–5, hypogynous; leaves alternate; ovary superior, 1-celled. A small order; not alpine.

1. AMARANTHUS, L.

Flowers in clusters, subtended by three bracts, unisexual, green; sepals distinct; seed-vessel containing a single seed.

A. Blitum, L. (*Euxolus viridis*, Moc., *Albesia Blitum*, Kunth); seed-vessel indehiscent, stem glabrous, leaves ovoid-rhomboidal, glabrous, toothed near the tip, often spotted; road-sides, common. *A. deflexus*, L. (*Albersia deflexa*, Gren.); seed-vessel indehiscent, stem hairy above, leaves of three linear-lanceolate lobes; on walls. *A. viridis*, L. (*sylvestris*, Desf.); seed-vessel dehiscing horizontally, sepals and stamens three each, leaves lanceolate-rhomboidal, stem glabrous; road-sides. *A. retroflexus*, L.; sepals and stamens five each, stem hairy; road-sides.

2. POLYCNEMUM, L.

Flowers subtended by two bracts, bisexual; sepals 5; stamens usually 3, filaments somewhat united.

P. arvense, L.; bracts shorter than sepals, seed-vessel very minute; cultivated land, rare. *P. majus*, A. Br.; bracts longer than sepals, seed-vessel larger, plant more robust; fields, rare.

Order LXX.—CHENOPODIACEÆ.

Flowers small, unisexual or bisexual; calyx inferior, sepals 3–5; stamens usually 5; ovary 1-celled, stigmas 2–4; leaves alternate; seed-vessel 1-seeded, frequently enclosed in the swollen calyx. A large order of inconspicuous herbs, widely distributed; not alpine.

1. CHENOPODIUM, L.

Flowers small, bisexual, without bracts; stem angular; seed-vessel a membranous utricle, often enclosed in the persistent calyx.

All the species of Goosefoot are weeds (usually annual) in cultivated land or waste places in the lowlands. The only Swiss species not English are *C. opulifolium*, Schrad., with orbicular-rhomboidal leaves, and *C. Botrys*, L., with sinuate-pinnatifid pubescent-glandular leaves. The remaining species are English, viz.:—*C. Vulvaria*, L., and *polyspermum*, L., with entire leaves, the former mealy, the latter glabrous; *C. album*, L., *ficifolium*, Sm., and *urbicum*, L., erect, mealy, with more or less toothed or lobed leaves, distinguished by the form of the leaf, deltoid-ovate in the first, oblong-hastate in the second, and triangular in the third; *C. hybridum*, L., and *murale*, L., glabrous, erect, with toothed or lobed leaves, acuminate in the former, deltoid-ovate in the latter; *C. rubrum*, L., erect, glabrous, usually red-tinted; *C. glaucum*, L., prostrate, leaves mealy beneath; and *C. Bonus-Henricus*, L., Good King Henry, perennial, leaves large, triangular.

2. BLITUM, L.

Flowers bisexual; sepals persistent, fleshy and swollen; styles 2; seed-vessel enclosed in the fleshy berry-like calyx.

B. virgatum, L.; stem very leafy, flowers green then red, solitary in the axils of the leaves, and forming a long leafy spike; stony places; Southern Switzerland, Tirol, Dauphiny.

3. ATRIPLEX, Tourn.

Flowers small, unisexual, without bracts, in clusters collected into branched cymes; stamens 3–5; styles 2; leaves alternate; seed-vessel a utricle enclosed in the enlarged calyx.

The only species of Orache undoubtedly wild in Switzerland are *A. patula*, L., with oblong or oblong-lanceolate leaves; and *hastata*, L., with broader more hastate leaves; both in waste places, the latter rare.

Order LXXI.—POLYGONACEÆ.

Flowers usually bisexual, often pink; sepals 3–6, persistent, green or pink; stamens 5–8; ovary superior, 1-celled, 1-ovuled; styles 1–3; leaves alternate, usually quite entire, with sheathing stipules (ochreæ); seed-vessel a nut containing a single seed. A large order, chiefly of temperate regions; very few alpine species.

1. POLYGONUM, L.

Flowers in terminal spikes or racemes; sepals 5, usually pink; stamens 5–8; stigmas 2–3.

Two species only are alpine, viz.:—*P. alpinum*, L.; flowers in a paniculate raceme, sepals yellowish-white or pink, leaves lanceolate, wavy; pastures; Southern Switzerland, Tirol, Piedmont, Dauphiny, Pyrenees; frequent. *P. viviparum*, L.; flowers in a terminal simple spike, sepals white, rarely pink, stem 3–8 in., inflorescence with bulb-like buds in the axils of the lowermost bracts; pastures, common. All the other Swiss species are familiar English plants, viz.:—

P. Bistorta, L., Bistort, Snake-root; stem 1–3 ft., flowers in a dense cylindrical terminal spike, sepals pink or purple; damp meadows. In wet places:—*P. amphibium*, L., with short pink spikes, and lanceolate floating leaves on long stalks; *P. Hydropiper*, L., with elongated green spikes, and lanceolate leaves with a very biting taste; *P. mite*, Schrank, a smaller plant, with much smaller spikes; and *P. minus*, Huds., similar, with narrower leaves and very small flowers. In waste places:—*P. lapathifolium*, L., with very large lanceolate leaves, usually spotted with black, and greenish-white flowers; and *Persicaria*, L., with smaller leaves and pink or white flowers. Prostrate road-side plant:—*P. aviculare*, L., Knotgrass, with pink flowers, very common. Plants with twining stem:—*P. Convolvulus*, L., with cordate-sagittate leaves and green flowers; and *P. dumetorum*, L., similar, the three outer sepals with broad membranous wings.

2. Rumex, L.

Flowers unisexual or bisexual, in racemose or panicled whorls; sepals 6, in two rows, the inner ones enlarged in fruit; stamens 6.

CIV. ONYCLA DIGYNA

The following species are alpine:—*R. alpinus*, L., Alpine Dock; leaves large, roundish-cordate, leaf-stalk strongly channelled, stem 2–3 ft.; pastures, common, especially near cow-huts. *R. scutatus*, L.; stem prostrate, glabrous, very brittle, leaves hastate or sagittate, with large basal lobes; stony places and walls, frequent. *R. arifolius*, All.; stem ascending, 1–3 ft., leafy, leaves thin, with spreading auricles; pastures and damp places, not uncommon. *R. nivalis*, Heg.; stem 2–4 in., simple, leafless, flowers in whorls, leaves rather thick, with indistinct auricles; very high; Switzerland, Tirol, Carniola, Bavaria.

The remaining species are English, viz.:—The various species of Dock:—*R. obtusifolius*, L., *conglomeratus*, L., *pulcher*, L., Fiddle-Dock, *crispus*, L., *sanguineus*, L., *nemorosus*, L., distinguished largely by the form of the enlarged inner sepals in fruit, and by the presence or absence of callosities on them. The Water-Docks:—*R. aquaticus*, L., and *Hydrolapathum*, Huds., with very large leaves; *R. maritimus*, L., and *palustris*, Sm., in marshes and by sandy shores of lakes. The Sorrels:—*R. Acetosa*, L., and *Acetosella*, L., Sheep's Sorrel, plants with very acid glabrous cordate-hastate leaves, in meadows.

3. Oxyria, L.

Resembling *Rumex*, but sepals 4; stigmas 2.

O. digyna, Hill. (*reniformis*, Hook.), Mountain Sorrel (Pl. 104); stem 6–18 in., nearly leafless, flowers in whorls, forming a slender lax raceme, fruit with broad wings, red when mature, radical leaves reniform, glabrous, on long stalks; wet rocks at a high elevation, common.

Order LXXII.—EUPHORBIACEÆ.

Flowers small, usually unisexual; sepals 0 or 2 or more; petals 0; the flower or the inflorescence usually subtended by bracts which are often large and coloured; ovary a 2–3-celled capsule with 2–3 simple or bifid styles; leaves usually alternate and simple. A very large order of herbs, shrubs, and trees, generally with a milky juice, chiefly Tropical and Sub-Tropical, represented in Europe by only a very few genera. Not alpine.

1. EUPHORBIA, L.

Inflorescence composed of many male and one female flower collected into a cluster, subtended by bracts and glands, which are usually yellow and crescent-shaped; ovary 3-celled, with three bifid stigmas; seed-vessel a 3-lobed capsule. Herbs (the European species), with abundance of latex.

The annual species of Spurge, which are common weeds in cultivated land in this country, are equally common in Switzerland, viz.:—*E. Helioscopia*, L., *platyphyllos*, L., *Peplus*, L., and *exigua*, L.; also, in the South and West. *E. falcata*, L., having a prickly point to the upper leaves; and *segetalis*, L., with linear-lanceolate acuminate leaves. *E. Lathyris*, L., Caper-Spurge, stem 1½–3 ft., leaves opposite, capsule very large, is occasional in cultivated land. *E. amygdaloides*, L., stem 6–12 in., very stout and leafy, leaves obovate-lanceolate, is frequent (in the spring); and *E. Cyparissias*, L., stem 6–12 in., leaves acicular, very crowded, very common; both woods. *E. virgata*, W. K.,

resembling the last, but with broader leaves, is reported from Canton Zürich. *E. stricta*, L., resembling *platyphyllos* in its tuberculated capsule, but umbel only 3- instead of 4–5 rayed, occurs by wood-sides; *E. verrucosa*, Lam., with numerous perennial stems, and yellow elliptic bracts tinged with red, on dry hills; *E. palustris*, L.; stem 3–6 feet, lateral barren branches very long, exceeding the umbel, in marshes; *E. dulcis*, L., with triangular-oval bracts, leaves denticulate towards the tip, and tuberculated capsule, in woods; and *E. Gerardiana*, Jacq., with linear-lanceolate glaucous leaves, umbel with very numerous rays, and smooth capsule, in stony places.

2. MERCURIALIS, Tourn.

Flowers small, usually dicœcious; sepals 3; stamens 8–20; ovary 2-celled; leaves opposite, stipulate; not milky.

Both the English species of Dog's-Mercury, *M. perennis*, L., perennial, flowering in the spring; and *annua*, L., annual, flowering in the autumn, occur also in Switzerland.

3. BUXUS, Tourn.

Flowers monœcious; sepals 4–12; stamens 4; ovary 3-celled; seed-vessel a woody 3-celled capsule; an evergreen shrub with opposite leaves; not milky.

B. sempervirens, L., Box; hills on a calcareous soil; Jura, Pyrenees.

Order LXXIII.—URTICACEÆ.

Flowers usually unisexual, small, green; calyx 3–8-cleft; stamens 3–8; ovary usually 1-celled; style 1; seed-

vessel an indehiscent nut. A very large order of herbs, shrubs, and trees, belonging chiefly to Tropical and Sub-Tropical countries, with very few European representatives; not alpine.

1. URTICA, Tourn.

Flowers unisexual; calyx 4-cleft; stamens 4; leaves opposite, stipulate, furnished with stinging glands.

Our two English species of Stinging Nettle, *U. dioica*, L., with diœcious; and *urens*, L., with monœcious flowers, are equally common in Switzerland.

2. PARIETARIA, Tourn.

Flowers in dense clusters, mostly unisexual; calyx 4-cleft; stamens 4; leaves entire, without stipules; pollen expelled in puffs by the bursting of the anther.

P. officinalis, L., Wall-Pellitory, with its sub-species *erecta* and *diffusa* (*ramiflora*, Mönch.); common on walls and rocks.

3. HUMULUS, L.

Flowers small, diœcious; sepals 5; stamens 5; female flowers in the axils of large membranous bracts, which form a dense catkin-like spike; ovary 1-celled; stem twining.

H. Lupulus, L., Hop.; hedges, common.

4. ULMUS, L.

Flowers bisexual, in clusters; leaves with deciduous stipules; fruit a 1-seeded samara. Trees with deciduous leaves.

U. campestris, L. (*glabra*, Mill.), our common Elm.; *montana*, With. (*major*, Sm.), Wych Elm, with somewhat larger leaves; common everywhere; and *U. effusa*, Willd. (*pedunculata*, Foug.); flowers pendant, on long stalks; Bâle, Aargau, Schaffhausen, rare.

5. CELTIS, Tourn.

Calyx 5-cleft; fruit a fleshy drupe.

C. australis, L.; a tree with solitary stalked flowers in the axils of the leaves; Southern Switzerland.

Order LXXIV.—EMPETRACEÆ.

Sepals 2–3; petals 2–3, very minute; stamens 3–4; fruit a drupe with 2–9 stones. Prostrate shrubby plants with very small leaves. A very small order.

1. EMPETRUM, L.

Flowers pink or white; sepals and petals 3 each; leaves linear, with recurved margins meeting on the under-side of the leaf.

E. nigrum, L., Crowberry; drupe black; hill-sides, common.

Order LXXV.—THYMELÆACEÆ.

Flowers usually bisexual, solitary or in cymes; calyx 4–5-lobed, often conspicuous, coloured; stamens 2–10; ovary superior, 1–2-celled; fruit a drupe or berry. A small order, of Temperate and Tropical regions; often fragrant shrubs.

1. Passerina, L.

Calyx persistent, with an urceolate or cylindrical tube, 4-lobed; stamens 8; ovary 1-celled, 1-ovuled; fruit dry, enclosed in the persistent calyx.

P. annua, Spr. (*Lygia Passerina*, Fas.); flowers greenish, 1–3 in the axils of the leaves, forming a long leafy spike, leaves linear or linear-lanceolate; dry fields; Switzerland, Pyrenees. *P. dioica*, Ram.; flowers yellow, sessile, solitary or in fascicles in the cluster of the leaves, leaves crowded, linear-oblong, stem prostrate, woody; Pyrenees, high. *P. calycina*, Lap.; flowers greenish-yellow, solitary, axillary, leaves crowded, linear, stem woody, 4–8 in.; Pyrenees, high.

2. Daphne, L.

Calyx 4-lobed, with a long tube, pink, yellow, or white, fragrant; stamens 8; fruit a coriaceous or fleshy drupe or berry. Shrubs.

A. Flowers pink, fragrant:—*D. Mezereum*, L., Mezereon; flowers appearing before the leaves in clusters of 2 or 3, leaves deciduous, berry bright red; mountain woods; Switzerland, Jura (abundant), Dauphiny, Pyrenees. *D. striata*, Tratt.; stem prostrate, flowers sessile, calyx glabrous, leaves leathery, linear-cuneate, mucronate, glabrous, with revolute margins; alpine rocks, frequent. *D. Cneorum*, L. (Fig. 105); stem erect, flowers shortly stalked, in many-flowered terminal clusters, calyx pubescent, leaves linear-ovate, crowded; Jura, Ticino, Carniola, Pyrenees. *D. petræa*, Leyb.; stem brittle, knotty,

CV.—DAPHNE CNEORUM.

leaves stiff, coriaceous, sessile, not mucronate; Southern Tirol, rare.

B. Flowers white or yellowish-green:—*D. Laureola*, L., Spurge-Laurel; flowers yellowish-green, drooping, in stalked few-flowered axillary cymes, leaves thick, evergreen, lanceolate; mountain woods, local. *D. alpina*, L.; flowers white, in terminal umbels, calyx woolly, leaves thin, light green, ovate, deciduous; alpine rocks, local. *D. Blagayana*, Fr.; flowers white, fragrant, in terminal umbels, stem unbranched, leaves obovate, evergreen; bushy places; Styria, Carniola, rare.

Order LXXVI.—SANTALACEÆ.

Flowers small, unisexual or bisexual, solitary or in cymes; calyx 3–5-lobed, often coloured; stamens 3–5; ovary 1-celled; ovules 2–5, of very simple structure, without integument; fruit a 1-celled 1-seeded achene; leaves entire. A small widely distributed order; mostly parasites.

1. THESIUM, L.

Flowers minute, bisexual, green or white, solitary in the axils of the leaves, or in corymbose cymes; calyx usually 5-lobed; stem usually prostrate, wiry; leaves narrow. Root-parasites. The species of Bastard-Toadflax run into one another, and are very difficult to distinguish.

A. Flowers subtended by a single bract:—*T. rostratum*, M. K.; stem terminating in a tuft of leaves without flowers; pastures; Switzerland, Tirol, Salzburg, Bavaria, rare.

B. Flowers subtended by three bracts; calyx rolled up to the base after flowering, one-third as long as the fruit:—*T. montanum*, Ehrh.; stem erect, 1½–2 ft., leaves linear-lanceolate, acuminate, dark blue-green; thickets, frequent. *T. linophyllum*, L. (including *humifusum*, DC., *intermedium*, Schrad., and *divaricatum*, DC.), stem prostrate, leaves linear, acute, yellowish-green; open hill-sides; Switzerland, Jura, Pyrenees, local.

C. Flowers subtended by three bracts; calyx rolled up only at the tip after flowering, equal to or longer than the fruit:—*T. alpinum*, L.; stem prostrate, 4–6 in., branching on one side only, flowers in a dense terminal unilateral raceme; alpine pastures, frequent. *T. tenuifolium*, Saut.; resembling the last, but stem more erect, flowers in a bilateral panicle; Switzerland, local. *T. pratense*, Ehrh.; stem prostrate, 6–12 in., branching on all sides, very flexuose; pastures, common.

Order LXXVII.—LORANTHACEÆ.

Flowers unisexual or bisexual; sepals thick, 4–8; stamens 4–8; ovary entirely inferior, 1-celled, 1-ovuled; ovules very rudimentary; fruit a 1-seeded berry; leaves usually opposite, coriaceous. Woody evergreen plants, parasitic on trees. A moderately large order, of Tropical and Temperate climates; very few in Europe; not alpine.

1. Viscum, L.

Flowers small, green, diœcious; leaves opposite, entire, yellowish-green; stem jointed, brittle; fruit a very viscid berry.

V. album, L., Mistletoe; parasitic on various trees, chiefly apple, hawthorn, and lime; not very common.

Order LXXVIII.—ELÆAGNACEÆ.

Flowers small, regular, unisexual or bisexual, white or yellow, solitary or in cymes; calyx 2–6-cleft; ovary enclosed in the thickened base of the calyx, 1-celled, 1-ovuled; fruit a utricle enclosed in the calyx-tube; leaves covered with brown or silvery peltate scales. A very small order of trees or shrubs; not alpine.

1. HIPPOPHAË, L.

Flowers dicœcious, the female solitary, the male in axillary clusters; sepals 2; stamens 2; leaves silvery with peltate scales.

H. rhamnoides, L., Sea-Buckthorn; spiny, leaves linear-lanceolate; beds of streams; Switzerland, Tirol, Styria, Carinthia, Salzburg, Dauphiny.

Order LXXIX.—ARISTOLOCHIACEÆ.

Flowers large, bisexual, solitary or in spikes or racemes, regular or irregular; calyx tubular, campanulate, or trumpet-shaped; stamens 6–12; ovary 4–6-celled; styles 6; fruit a capsule or berry; stem often climbing; leaves entire or lobed. A small order, chiefly Tropical; not alpine.

1. ARISTOLOCHIA, L.

Calyx coloured, inflated, trumpet-shaped; anthers usually 6, adnate in a whorl to the very short 6-lobed style; leaves entire.

A. Clematitis, L., Birthwort; flowers in clusters of 4–6, yellow, leaves cordate, apiculate, stem erect, not twining; waste places and vineyards; Switzerland, Dauphiny, Pyrenees, rare. *A. rotunda*, L.; flowers solitary, elongated; leaves cordate, obtuse; Ticino, Dauphiny, Pyrenees, rare.

2. ASARUM, L.

Flowers bisexual, solitary; calyx lurid purple, campanulate, 3-lobed; stamens 12; ovary partially inferior, 6-celled; styles 6; leaves all radical.

A. europæum, L., Asarabacca; flowers large ($\frac{1}{2}$ in.), on short woolly leafless scapes, leaves reniform-orbicular, on long stalks; woods and thickets, rare; Switzerland, Jura, Vosges, Puy-de-Dôme, Pyrenees.

Order LXXX.—CERATOPHYLLACEÆ.

Flowers solitary, axillary, minute, monœcious; calyx 0; stamens numerous; ovary 1-celled, 1-ovuled; leaves in whorls, sessile, divided into capillary segments. Submerged aquatic herbs. A very small order, consisting of the single genus

1. CERATOPHYLLUM, L.

Characters of the order.

C. demersum, L. (including *submersum*, L.), Hornwort; stagnant water in the lowlands; not common.

Order LXXXI.—CUPULIFERÆ.

Trees or shrubs with alternate stipulate leaves; flowers unisexual, monœcious; male flowers in catkins, female

flowers solitary or in fascicles; fruit a nut seated in a cup (cupule), formed by the coalescence of a whorl of hardened often woody bracts. A moderately large order, belonging chiefly to the Northern Temperate Zone; no alpine species.

1. FAGUS, L.

Fruit usually in pairs, enclosed in the hardened or coriaceous scaly involucre (beech-mast).

F. sylvatica, L., Beech; common.

2. QUERCUS, L.

Fruit an acorn, seated in a smooth or spiny cup.

Our two English Oaks, *Q. pedunculata*, Ehrh., with sessile leaves, and acorns on long stalks; and *sessiliflora*, Salisb., with longish leaf-stalk, and acorns nearly sessile; common. Also *Q. pubescens*, Willd. (*lanuginosa*, Thuill.), a much smaller tree, the under surface of the leaves pubescent; Southern and Eastern Switzerland, Pyrenees. *Q. Cerris*, L.; stigmas yellow, scales of cup long, linear-subulate, twisted, spreading; Ticino, Jura, rare.

3. CASTANEA, L.

Fruit enclosed in a spiny capsule-like involucre.

C. vulgaris, Lam. (*sativa*, Mill., *vesca*, Gærtn.), Spanish Chestnut, Sweet Chestnut; South of the Alps.

4. CORYLUS, L.

Fruit a woody 1-seeded nut, enclosed in the greatly enlarged coriaceous involucre.

C. Avellana, L., Hazel; very common.

5. Carpinus, L.

Fruit 1-celled, 1-seeded, enclosed in the greatly enlarged leafy lobed involucre.

C. Betulus, L., Hornbeam; frequent.

6. Ostrya, Scop.

Female flowers in strobiliform catkins; fruit 1-seeded, enclosed in the bladdery papyraceous involucre.

O. carpinifolia, Scop.; leaves oval, acuminate, slightly cordate, doubly serrate; Grisons, Ticino, rare.

Order LXXXII.—BETULACEÆ.

Flowers unisexual, monœcious; male flowers in pendulous catkins, female flowers beneath the scales of the female catkins; stamens 2–4; sepals 0 in female flowers; ovary inferior, 2-celled, with one ovule in each cell; Temperate and Arctic Zones.

1. Betula, L.

Stamens 2; scales of female catkin thin, deciduous, 3-fid.

B. alba, L. (*verrucosa*, Ehrh.), our common Birch. *B. pubescens*, Ehrh. (*glutinosa*, Fr.); leaves orbicular or rhomboid, pubescent beneath, fruit with a broad wing; peat-bogs, local. *B. intermedia*, Thom.; resembling the last, but a shrub; peat-bogs; Jura, rare. *B. nana*, L.; a small shrub, 1–3 ft., female catkins erect, sessile, leaves broader than long, crenate; peat-bogs at a high elevation; Switzerland (rare), Jura.

2. Alnus, L.

Stamens 4; scales of female catkin persistent, woody.

A. glutinosa, Gaertn., our common Alder; also grown largely for making charcoal for gunpowder. *A. viridis*, DC.; leaves ovate, acute, doubly serrate, green on both sides, fruit broadly winged; frequent at a high elevation. *A. incana*, Willd.; leaves glaucous or downy beneath, fruit not winged; sides of streams; Switzerland, Jura, Lombardy. *A. corylifolia*, Kern.; leaves roundish-ovate, nearly uniformly serrulate, covered with short hairs beneath; Tirol, rare (Pusterthal, Scheiblingstein).

Order LXXXIII.—SALICACEÆ.

Flowers unisexual, dicœcious; male and female flowers in catkins; calyx 0; stamens 2 or more; ovary 1-celled; styles 2; ovules numerous. Trees and shrubs, belonging chiefly to the Northern Temperate and Arctic Zones.

1. Populus, L.

Catkins drooping, scales lobed or cut, crenate; stamens 4–30. Lofty trees; not alpine.

P. alba, L., White Poplar; leaves cottony beneath; occasional. *P. nigra*, L., Black Poplar; more common, especially by water. *P. canescens*, Sw.; possibly a hybrid; occasional. *P. tremula*, L., Aspen; common.

2. Salix, L.

Catkins usually erect; scales entire; stamens usually 2–3. Small trees or shrubs.

The very numerous species of Willow present great difficulties, owing to the minute characters which separate them, and their tendency to hybridise. There are a large number of alpine or sub-alpine forms, viz. :—

A. Catkins lateral on the shoots of the previous year, stalked or sessile; ovary distinctly stalked:—*S. nigricans*, Sm. (including *Mielichhoferi*, Saut.); catkins on leafy stalks, leaves dark green above, bluish-green beneath, becoming black when dry, style often very long; wet places. *S. hastata*, L.; scales of catkins covered with long white silky hairs, leaves green or bluish beneath; rocks at a high elevation; Switzerland, Dauphiny, Pyrenees, rare. *S. myrtilloides*, L.; style very short, leaves elliptic-lanceolate or obovate, stipules cordate-ovate; Upper Bavaria. *S. grandifolia*, Ser.; style 0, leaves downy, glabrous when old, up to 5 in. long; a shrub 3–6 ft. high; Alps, Jura, frequent. *S. pubescens*, Schleich. (*albicans*, Bonj.); a shrub not more than 3 ft., with knotted branches, leaves very hairy; high; Vaud, Valais (Rhone Glacier), Tirol.

B. Catkins as in the last; ovary very shortly stalked or sessile:—*S. glabra*, Scop.; catkins cylindrical, on short leafy stalks, scales pink at the tip, leaves broadly lanceolate, crenate or serrate, bluish-glaucous beneath, ovary glabrous, style long; high, frequent. *S. cæsia*, Vill.; catkins smaller, style short, leaves entire; very high, local. *S. repens*, L.; leaves small, lanceolate or elliptic, silvery white beneath, stipules lanceolate; peat-mosses; Switzerland, Jura, Tirol, Lombardy. *S. Arbuscula*, L. (including *fœtida*, Schleich., and *Waldsteiniana*, Willd.); stem erect, leaves broadly lanceolate or elliptic, light-green or grey-green beneath, catkins stalked, slender,

CVI SALIX RETICULATA

ovary covered with white tomentum; alpine pastures. *S. phylicifolia*, L. (including *Weigeliana*, Willd.); similar, but catkins thick, dense, sessile; Tirol. *S. Myrsinites*, L. (including *ovata*, Ser., and *Jacquiniana*, Willd.); stem prostrate, leaves green and shining on both sides, catkins on long stalks, ovary at first woolly; alpine pastures, frequent. *S. daphnoides*, Vill.; catkins appearing before the leaves, branches glaucous-blue; sub-alpine. *S. Lapponum*, L. (*helvetica*, Vill.); leaves elliptic-lanceolate, densely white-tomentose beneath, stipules half-cordate, catkins sessile; high, moist, frequent. *S. glauca*, L.; leaves narrowly lanceolate, silky on both sides, afterwards glabrous, stipules ovate, acute, catkins on long stalks; alpine pastures; Switzerland, Tirol.

C. Catkins terminal, at the apex of shoots of the same year; low shrubs:—*S. reticulata*, L. (Pl. 106); leaves large, elliptic, entire, with prominent nerves and white tomentum beneath, catkins silky, on long stalks; high, frequent. *S. vestita*, Pursh.; resembling the last, but leaves more woolly, catkins on short stalks, tomentose; Salzburg, rare. *S. herbacea*, L.; stem prostrate, leaves very small, nearly orbicular, crenate-serrate; very high; Switzerland, Dauphiny, Pyrenees. *S. retusa*, L. (including *Kitaibeliana*, Willd.); leaves obovate, entire, truncate, with parallel nerves; high, frequent. *S. serpyllifolia*, Koch; leaves smaller, acuminate, catkins very few-flowered, stems interwoven; high, frequent.

The lowland Swiss species may be arranged under the following groups:—*S. triandra*, L.; stamens 3. *S. pentandra*, L.; stamens usually 5. *S. fragilis*, L., Withy; leaves lanceolate-acuminate, stipules half-cordate, deciduous. *S. alba*, L., White Willow; leaves narrowly lan-

ceolate, stipules ovate-lanceolate, deciduous. *S. Caprea*, L., Sallow; leaves elliptic, tomentose beneath; a small tree. *S. aurita*, L.; leaves obovate-oblong, catkins short, dense-flowered. *S. viminalis*, L., Osier; leaves linear-lanceolate, catkins sessile, branches very flexible. *S. purpurea*, L.; leaves linear-lanceolate, catkins with purple-black scales.

Division II.—MONOCOTYLEDONES or ENDOGENS.

Stem, when perennial, with irregularly dispersed woody bundles, not in concentric circles, with no central pith or separable bark; leaves usually parallel-veined; sepals, petals, and stamens usually in threes; embryo with one cotyledon.

Class V.—PETALOIDÆ.

Calyx and corolla usually both present and coloured. (Orders LXXXIV.–XCIX.)

Order LXXXIV.—HYDROCHARIDEÆ.

Aquatic herbs with floating or submerged opposite or whorled leaves; flowers usually unisexual and diœcious, buds enclosed in spathes; perianth 6-parted, coloured or inconspicuous; stamens 3–12; ovary 1–6-celled. A very small order, widely distributed; not alpine.

1. Hydrocharis, L.

Diœcious; sepals 3, green; petals 3, white; stamens 12, some of them imperfect; ovary 6-celled; styles 6; leaves orbicular, entire.

H. Morsus-Ranæ, L., Frog-bit; an aquatic plant with floating leaves; Southern Switzerland, Pyrenees, rare.

2. Vallisneria, L.

Diœcious; male flowers small, on short stalks; female flowers on long stalks which coil up before and after flowering; both enclosed in spathes; leaves all radical, very long, grass-like; ovary unilocular; styles 3.

V. spiralis, L.; Lake Lugano. The contrivance for fertilisation in this plant is very remarkable. The very long stalk of the female flower is coiled up till the flower is mature, when it uncoils, bringing the flower to the surface. At the same time the male flowers mature, break off from their flower-stalk, rise to the surface, and discharge their pollen, which floats to the stigmas of the female flowers. After pollination has been effected, the stalk of the female flower again coils up, bringing it below the surface to ripen its seeds.

Elodea canadensis, Mich. (*Anacharis Alsinastrum*, Bab.), the Canadian Water-Weed, is naturalised in the Swiss lakes and throughout Europe.

Order LXXXV.—ORCHIDEÆ.

Flowers bisexual, irregular; sepals 3, usually nearly alike, coloured; petals 3, the lower one or lip usually larger and often spurred; stamens 1–2, confluent with the style; pollen generally collected into a pollinium in each anther-cell; ovary inferior, 1-celled; stigma sessile; ovules minute, very numerous, on three parietal placentæ;

seed-vessel a 3-valved capsule. A very large order, belonging to nearly all climates, but most abundant in the Tropics.

1. Orchis, L.

Root composed of globose, ovoid, or palmate tubers; leaves chiefly radical, sheathing; flowers in a usually dense spike; corolla spurred, with a decurved or deflexed lip (labellum); pollen-masses falling forwards after removal; a projecting rostellum beneath the anther-lobes; ovary generally twisted.

A. Lobes of labellum not coiled spirally; sepals and lateral petals connivent into a hood:—*O. ustulata*, L., Dark-winged Orchis; stem 3–6 in., flowers small ($\frac{1}{3}$ in.), lip white with dark purple spots, hood black-purple, lip 3-cleft for half its length, spike elongated, cylindrical; pastures, chiefly calcareous; Switzerland, Jura, Pyrenees. *O. tridentata*, Scop.; resembling *ustulata*, but flowers larger, lip pale lilac spotted with red, spur longer; Ticino. *O. coriophora*, L.; spike dense, cylindrical, sepals and lateral petals acuminate, hood reddish-brown, lip reddish with purple dots; meadows, local. *O. globosa*, L. (Pl. 107); spike dense, hemispherical, flowers pink, lip with darker dots, sepals and lateral petals ending in a broad spathulate point, stem 8–18 in., leafy, tuber undivided; meadows, frequent. *O. Morio*, L., Green-winged Orchis; spike lax, flowers pink with green veins, sepals and petals obtuse, lip spotted, spur nearly straight; meadows, common. *O. purpurea*, Huds. (*fusca*, Jacq.); stem 1–3 ft., spike dense, flowers large ($\frac{3}{4}$ in.), sepals and petals green-purple outside, spotted inside, lip spotted with purple, spur short; thickets, occasional. *O. mili-*

CVII.—ORCHIS GLOBOSA

taris, L.; stem 1–1½ ft., flowers in a dense oblong spike, large (1 in.), purple, lip pale, lateral lobes linear, leaves large; thickets; Switzerland, Jura, Lombardy, Pyrenees. *O. Simia*, Lam. (*tephrosanthos*, Vill.); resembling the last, but more slender, lobes of crimson lip and segments of central lobe very narrow; thickets, occasional.

B. Lobes of lip not coiled spirally; lateral sepals spreading or reflexed:—*O. Spitzelii*, Saut.; flowers purple, spur conical, shorter than ovary, pointing downwards, tubers undivided; meadows, rare; Tirol, Salzburg. *O. pallens*, L.; flowers pale yellow with a darker spot, middle lobe of lip entire or crenate; thickets, rare; Switzerland, Dauphiny, Pyrenees. *O. mascula*, L., Purple Meadow-Orchis; spike lax, flowers purple, middle lobe of lip crenate, spur long, leaves usually spotted; meadows common. *O. speciosa*, Host.; resembling *mascula*, but sepals and lateral petals very acuminate; occasional. *O. laxiflora*, Lam.; flowers purple, large (1 in.), in a lax spike, middle lobe of lip shorter than the lateral ones, often 0, leaves broad, tubers undivided; wet meadows. *O. palustris*, Jacq.; resembling *laxiflora*, but middle lobe of lip as long as the lateral ones, spur short, leaves narrower; wet meadows, local. *O. latifolia*, L., Marsh-Orchis; stem 1–3 ft., leafy, flowers dull purple, lip spotted, 3-lobed, lobes entire, leaves spreading, usually spotted; marshes, frequent. *O. incarnata*, L.; resembling *latifolia*, but flowers larger, darker, leaves narrower, erect, not spotted; meadows, frequent. *O. Traunsteineri*, Saut. (*angustifolia*, Rchb.); resembling *incarnata*, but stem more slender, leaves linear; Switzerland, rare. *O. maculata*, L., Spotted Meadow-Orchis; spike few-flowered, flowers pale pink or white, lateral lobes of lip toothed,

6. Serapias, L.

Sepals and petals connivent into a hood; flowers large; lip 3-lobed, not spurred, lateral lobes ascending; stigma prolonged into a beak. Not alpine.

S. longipetala, Poll. (*pseudo-cordigera*, Mor.); spike elongated (2–4 in.), bracts very large, coloured, sepals acuminate, lip 2-lobed, lanceolate, pubescent, very long, stem 12–15 in.; Ticino, Pyrenees. *S. Lingua*, L.; spike few- (2–4) flowered, bracts lanceolate, shorter than the flowers, sepals lanceolate, lip 3-lobed, glabrous, stem 4–12 in.; Pyrenees.

7. Nigritella, Rich.

Flowers small, fragrant, very dark purple; sepals and petals nearly alike, spreading; lip undivided, turned upwards, with a short saccate spur; tubers palmate.

N. angustifolia, Rich. (*nigra*, Rchb.); flowers black-purple, rarely pink, spur about a quarter as long as ovary, lip scarcely half as broad as long, spike short, dense, stem 3–6 in., leaves linear; alpine pastures, frequent. Several other species are described, which appear to be hybrids with different species of *Gymnadenia*.

8. Gymnadenia, Br.

Sepals spreading; lip 3-lobed, decurved, with a long spur; stigma large, tumid, 2-lobed; tubers 2, palmate.

G. conopsea, Br., Sweet-scented Orchis (*Habenaria conopsea*, Benth.); fragrant, spike slender, elongated, flowers pink, spur very long and slender, 1½–2 times as

CVIII GYMNADENIA ODORATISSIMA

long as ovary, stem 6–8 in., leafy, leaves linear-lanceolate, keeled; pastures, frequent. *G. odoratissima*, Rich. (Pl. 108); very fragrant, flowers pink, spur not longer than ovary, leaves linear; alpine pastures, frequent.

9. Cœloglossum, Hartm.

Sepals connivent into a hood; lip 3-lobed or tridentate, with a very short spur; stigma depressed; root-tubers 2 or more, lobed.

C. albidum, Hartm. (*Habenaria albida*, Br., *Gymnadenia albida*, Rich.); flowers small, greenish-white, in a cylindrical spike, lip deeply 3-lobed, spur one-third as long as ovary, stem 1–6 in., leafy, leaves broadly lanceolate, root-tubers numerous, slender; pastures, frequent. *C. viride*, Hartm. (*Habenaria viridis*, Br.), Frog Orchis; flowers yellowish-green tinged with brown, in a lax elongated spike, lip with 3 teeth, spur very short, saccate, leaves narrower, root-tubers 2.

10. Platanthera, Rich.

Flowers large, white, fragrant, in a lax spike; sepals spreading; lip undivided, with a long spur; stigma depressed; root-tubers 2, lobed.

P. bifolia, Rich. (*Habenaria bifolia*, Br.), Smaller Butterfly-Orchis; flowers pure white, very fragrant, stem 6–8 in., with usually two often opposite ovate leaves, lip linear, spur very slender, $1\frac{1}{2}$–2 times as long as ovary; thickets, frequent. *P. chlorantha*, Cust. (*Habenaria chlorantha*, Bab., *P. montana*, Rchb.), Larger Butterfly Orchis; flowers larger, greenish-white, not so fragrant, spur slightly swollen at the tip; thickets.

11. Corallorhiza, L.

Brown leafless saprophytes; flowers few, small; upper sepal and petals connivent; lip short, deflexed, with a very small spur; pollen-masses 4; stem with sheathing scales; root of branched fleshy interlacing fibres.

C. innata, Br., Coral-Root; stem slender, greenish-white, flowers yellowish, lip spotted with red, root coral-like; moist woods; Switzerland, Jura, Vosges, Dauphiny, Pyrenees, rare.

12. Liparis, Rich.

Sepals and petals spreading, linear; lip entire; pollen-masses 4; stem leafless. Not alpine.

L. Læselii, Rich. (*Sturmia Læselii*, Rchb.); stem 4–8 in., swollen at the base, root-leaves usually 2, elliptic-lanceolate; peat-bogs; Switzerland, Jura, Tirol, rare.

13. Malaxis, Sw.

Flowers small, green; sepals and petals spreading, the latter very small; lip minute, concave; pollen-masses 4; leaves few.

M. paludosa, Sw.; stem 1–4 in., swollen at the base, leaves few, fringed with bulbils, flowers minute, yellowish-green, lip erect; swamps, very rare; Einsiedeln, Vosges. *M. monophylla*, Sw.; flowers minute, greenish, lip acuminate, stem triangular, with usually one leaf; moist meadows; Switzerland, Tirol, rare.

14. Neottia, L.

Brown leafless saprophytes; sepals and petals incurved; lip with a saccate base, bifid; pollen-masses 2,

powdery; stem covered with brown sheathing scales. Not alpine.

N. nidus-avis, L., Bird's-nest Orchis; stem thick, flowers about $\frac{1}{3}$ in., grey-brown, root a mass of succulent stout interlacing fibres; woods; Switzerland, Pyrenees, local.

15. Listera, Br.

Flowers small, green; sepals and petals spreading; lip deflexed, not spurred; lateral lobes 0 or very small; pollen-masses 2, powdery; rostellum elongated; leaves 2, opposite.

L. ovata, Br., Twayblade; stem 1–1½ ft., bearing two ovate leaves, flowers yellowish-green, lip linear, bifid; bushy places, frequent. *L. cordata*, Br.; stem 3–4 in., slender, bearing two cordate leaves, flowers yellowish-green, lip 3-fid, with two small linear lobes; mountain woods, rare; Switzerland, Jura, Vosges, Pyrenees.

16. Goodyera, Br.

Flowers small, in spiral spikes; lateral sepals deflexed; lip decurved, saccate at the base; pollen-masses 2, coherent; rostellum beaked; root-stock creeping.

G. repens, Br.; flowers white, few, leaves ovate, net-veined, the lower ones stalked, root-stock branched; pine-forests, rare.

17. Epipogum, Gmel.

Leafless saprophytes; sepals and petals spreading; lip 3-lobed, with a short stout spur; rostellum 0; pollen granular. Not alpine.

E. Gmelini, Rich. (*aphyllum*, Sw.); flowers few (3–5),

large, pale yellow, stem 4–8 in., tumid at the base, root-stock coral-like; on rotten wood, very rare.

18. Limodorum, Sw.

Sepals and petals sub-campanulate; lip entire, concave, spurred; pollen-masses 2. Not alpine.

L. abortivum, Sw.; whole plant of a violet tinge, flowers large, violet, stem 15–30 in., leaves reduced to sheathing coloured scales; woods; Switzerland, Jura, Styria, Pyrenees, very rare.

19. Spiranthes, Rich.

Flowers small, white, in spiral spikes; sepals and petals alike, sepals gibbous at the base, forming a tube round the lip; pollen-masses 4, powdery; stem leafy.

S. autumnalis, Rich. (*Neottia spiralis*, Sw.), Lady's-Tresses; stem 4–6 in., slender, with small distant leaves, spike dense, pubescent, lower leaves in lateral rosettes, ovate, acute; open hill-sides, local. *S. æstivalis*, Rich.; stem 6–18 in., spike elongated, slender, flowers larger, stem with two or three linear-lanceolate leaves; bogs, rare.

20. Epipactis, Rich.

Flowers in bracteate racemes, green or purple; ovary straight, on a twisted stalk; basal lobe of lip concave; pollen-masses 2, powdery; rostellum short, erect; stem leafy; capsule pendant; root-stock creeping.

E. latifolia, Sw., Helleborine; flowers green variegated with purple, lip lilac, stem 2–3 feet, leaves broadly ovate;

CIX.—CYPRIPEDIUM CALCEOLUS.

woods, frequent. *E. rubiginosa*, Crntz. (*atrorubens*, Sch.); flowers purple, smaller, scented, terminal lobe of lip pointed, recurved, protuberance at the base wrinkled, stem more slender; thickets, especially calcareous, local. *E. microphylla*, Sw.; plant more slender, stem 8–18 in., leaves much smaller, flowers fragrant, lip gibbous at the base; mountain woods; Western Switzerland, rare. *E. palustris*, Crntz.; flowers few, large, variegated with white, green, and purple, terminal lobe of lip blunt, rounded; bogs; Switzerland, Jura, Dauphiny, Pyrenees, rare.

21. CEPHALANTHERA, Rich.

Flowers large, white or red, in few-flowered bracteate spikes; ovary twisted; sepals and petals incurved; lip saccate; pollen-masses 2, powdery; rostellum 0; stem leafy; capsule erect; root-stock creeping.

C. grandiflora, Gray (*pallens*, Rich.); flowers large ($\frac{2}{3}$ in.), white, distant, bracts longer than the ovary, leaves ovate, acuminate, stem 12–24 in.; thickets, occasional. *C. ensifolia*, Rich. (*xiphophyllum*, Rchb.); flowers white, smaller, distant, bracts much shorter than the ovary, leaves lanceolate, the upper ones linear; bushy places, rare. *C. rubra*, Rich.; flowers red-purple, ovary pubescent, bracts longer than ovary, leaves lanceolate, acute, stem 6–18 in.; bushy places, especially calcareous, local.

22. CYPRIPEDIUM, L.

Flowers very large, usually few; sepals and petals spreading; lip very large, inflated, not spurred; stamens 2 (1 in all the other genera); rostellum 0; stem leafy; root-stock creeping.

C. calceolus, L., Lady's Slipper (Pl. 109); flowers solitary or 2–3, subtended by a leafy bract, lip slipper-shaped, yellow spotted with red, sepals brown-purple, acuminate. This, one of the most striking of European plants, is met with occasionally in stony woods at a moderately high elevation, in Switzerland, Jura, Tirol, Lombardy, Dauphiny, and Pyrenees, but is nowhere abundant.

Order LXXXVI.—IRIDEÆ.

Flowers usually regular; sepals and petals 3 each, all coloured; stamens 3; style simple; stigmas 3, often dilated; ovary inferior, 3-celled; seed-vessel a 3-celled capsule; leaves springing from a creeping rhizome, corm, or bulb, often ensiform. A large order, most abundant in the warmer Temperate Zone; no truly alpine species.

1. Crocus, L.

Flowers solitary or in clusters, large; ovary underground; stigmas dilated or laciniate; stem 0; leaves all radical, springing from a fleshy corm surrounded by membranous sheaths.

C. vernus, Wulf.; flowers few, violet or white, sepals and petals elliptic-obovate, concave, stigmas exceeding the anthers, bright yellow, denticulate; pastures; Alps (calcareous), Jura, Dauphiny, Pyrenees. *C. albiflorus*, Kit.; very similar, but stigmas shorter than the anthers, leaves narrower; Switzerland, Tirol, Carinthia, Salzburg. *C. nudiflorus*, Sm. (Pl. 110); flowers always solitary, appearing in the autumn (the leaves in the spring), violet,

CX.—CROCUS NUDIFLORUS.

stigmas orange, truncate, corm small, enclosed in a fibrous envelope; Pyrenees.

2. Iris, L.

Flowers regular, enclosed in a green or brown spathe; sepals usually larger than the petals, all brightly coloured; stigmas 3, petaloid, bifid at the apex, arching over the stamens; leaves chiefly radical, ensiform, springing from a fleshy rhizome.

A. Sepals bearded on the inside:—*I. germanica*, L., Purple Flag; flowers large, several on a stem, nearly sessile, sepals chiefly blue, reflexed, filaments as long as the anthers; rocks and walls; Southern Switzerland, Pyrenees. *I. pallida*, Lam.; stem bearing several flowers, sepals violet, stem longer than the leaves; Western Switzerland, Tirol. *I. virescens*, Red.; flowers whitish-yellow, tube of perianth enclosed in the spathe, stem longer than the leaves; rocks; Sion. *I. pumila*, L.; tube of perianth much longer than the spathe, stem 2–4 in., shorter than the leaves, flowers variable in colour; Southern Tirol.

B. Sepals not bearded on the inside:—*I. Pseudacorus*, L., Yellow Flag; flowers yellow, sepals recurved, striped with brown, petals very small and narrow; by water, frequent. *I. sibirica*, L.; flowers violet, petals larger than the stigmas, stem 1½–3 ft., longer than the leaves, cylindrical; damp meadows; Switzerland (rare), Jura, Tirol, Piedmont, Lombardy, Pyrenees. *I. graminea*, L.; flowers violet, petals larger than the stigmas, stem 6–9 in., shorter than the narrowly lanceolate leaves, 2-edged; Ticino (rare), Vosges, Pyrenees.

3. Gladiolus, L.

Flowers in a unilateral spike, somewhat irregular; sepals and petals 3 each, all coloured, combined into a short tube; stigmas 3, broad, undivided.

G. segetum, Gawl.; flowers numerous, purple, stem 18–30 in., anthers longer than the filaments; cultivated land; Geneva, Lugano. *G. communis*, L. (including *illyricus*, Koch); flowers 5–10, stem 12–24 in., anthers shorter than the filaments; Canton-de-Vaud, Pyrenees. *G. imbricatus*, L.; very similar, but flowers more numerous, more crowded; Ticino. *G. palustris*, Gaud.; spikes few- (2–5) flowered; anthers shorter than the filaments; corm enveloped in a fibrous tissue; damp meadows; Switzerland (rare), Tirol, Lombardy, Salzburg.

Order LXXXVII.—AMARYLLIDEÆ.

Flowers usually regular, solitary or few on a leafless scape; sepals and petals conspicuous, coloured, often united at the base, and with a crown at the mouth of the tube; stamens 6; stigmas 1–3; ovary inferior, 3-celled; seed-vessel usually a 3-celled capsule; leaves radical, springing from a bulb. A large order, belonging chiefly to the warmer Temperate and Tropical Zones; no truly alpine species.

1. Narcissus, L.

Flowers solitary or in umbels, large, yellow or white, enclosed in a brown membranous spathe; sepals and petals united below into a tube, the mouth of which is surmounted by a circular crown.

CXI.—NARCISSUS JUNCIFOLIUS.

A. Crown bell-shaped; leaves broadly linear:—*N. Pseudo-narcissus*, L., Daffodil, Lent-Lily; crown as long as the perianth-segments; meadows, common. *N. incomparabilis*, Curt.; flowers paler, crown bright yellow, half as long as the perianth-segments; Valais, Ticino.

B. Crown shallow; tube of perianth elongated; leaves nearly flat:—*N. poeticus*, L.; flowers large, usually solitary, white, fragrant, crown yellow with a red crenulated border; meadows, local; Southern Switzerland, Jura, Carinthia, Pyrenees. *N. biflorus*, Curt.; flowers large (1½ in.), fragrant, usually in pairs, pale yellow, crown dark yellow; Valais, Geneva, Lombardy, Pyrenees. *N. radiiflorus*, Salisb.; flower solitary, white, sepals and petals lanceolate, not overlapping, ovary cylindrical, stem more slender, leaves narrower; meadows; Switzerland, Jura, Styria, Savoy.

C. Tube elongated; crown saucer-shaped; leaves subulate or cylindrical:—*N. juncifolius*, Req. (Pl. 111); flowers 1–3, yellow, fragrant, crown orange, tube very long and slender, leaves subulate; Pyrenees.

Many other species of *Narcissus*, especially belonging to the sections *Jonquilla* and *Tazetta*, grow in the plains of Lombardy and in the Pyrenean valleys.

2. GALANTHUS, L.

Flowers solitary, white, pendulous, enclosed in a membranous spathe; sepals spreading; petals small, erect, with green streaks; leaves 2, linear.

G. nivalis, L., Snowdrop; meadows and orchards; Switzerland, Pyrenees; not common.

3. Leucojum, L.

Resembling *Galanthus*, but scape 2–6-flowered; petals larger; leaves more numerous and broader.

L. æstivum, L., Snowflake; scape 12–20 in., 3–6-flowered; damp meadows, rare; Yverdun, Jura, Pyrenees. *L. vernum*, L. (Pl. 112); scape 8–15 in., 1–3-flowered, flowering earlier than the last (March); damp meadows; Switzerland, not uncommon.

Order LXXXVIII.—LILIACEÆ.

Flowers usually regular and conspicuous; sepals and petals usually three each, all brightly coloured, distinct or united; stamens usually 6; anthers bursting inwards; ovary superior; styles 1–3; fruit a 3-celled capsule or berry; stem and leaves mostly springing from a bulb or creeping rhizome. A very large order, belonging to all climates, chiefly the warmer; the number of alpine species is very small.

1. Convallaria, L.

Flowers small, white, in racemes, nearly orbicular, on a leafless scape; leaves 2–3, elliptical, springing from a slender rhizome; fruit a berry.

C. majalis, L., Lily of the Valley; fragrant; woods, common.

2. Polygonatum, Tourn.

Flowers axillary and solitary or in racemes, pendulous, usually greenish-white; sepals and petals united below; stem leafy, springing from a stout rhizome; perianth

CXII.—LEUCOJUM VERNUM.

tubular-campanulate; leaves broad, usually alternate; fruit a berry.

P. multiflorum, All., Solomon's Seal; stem 2–3 ft., peduncles axillary, bearing 2–5 flowers, leaves elliptic, alternate, berry blue-black; woods, frequent. *P. officinale*, All. (*Convallaria Polygonatum*, L.); stem 6–12 in., flowers larger, usually solitary, stem angular; woods, frequent. *P. verticillatum*, All. (*Convallaria verticillata*, L.); leaves linear-lanceolate, in whorls of 3–7, flowers axillary, greenish-white, berry violet; mountain woods, local, abundant in Jura.

3. Maianthemum, Wigg.

Sepals and petals 2–3 each, distinct; stamens 4–6; flowers small, white, in few-flowered racemes; rhizome slender; fruit a berry.

M. bifolium, DC. (*M. Convallaria*, Roth, *Convallaria bifolia*, L., *Smilacina bifolia*, Desf.); stem 4–8 in., slender, bearing two thin cordate-ovate stalked leaves; mountain woods, common.

4. Streptopus, Rich.

Flowers solitary in the axils of the leaves, white; sepals and petals distinct, reflexed; stigmas 3; fruit a berry.

S. amplexifolius, DC.; flower-stalk geniculate, stem 12–20 in., leaves cordate-amplexicaul, berry red; mountain woods, rare.

5. Asparagus, L.

Flowers small, axillary, often unisexual; stem slender, branched, springing from a creeping rhizome; leaves

reduced to minute scales, with fascicles of needle-like branches in their axils; fruit a berry.

A. officinalis, L., Asparagus; stem 20–40 in., flower-stalk jointed near the middle, berry about the size of a pea; stony places near water; Switzerland, rare. *A. tenuifolius*, L.; stem 12–20 in., flower-stalk jointed close to the flower, berry about the size of a cherry; mountain woods; Ticino, Dauphiny, rare.

6. Ruscus, L.

Flowers unisexual and diœcious; stem shrubby; leaves reduced to minute scales, and bearing in their axils leaf-like branches (cladodes), with the flowers on their upper surface; stamens 3, united into a short column; fruit usually a 1-celled berry.

R. aculeatus, L., Butcher's-Broom, Knee-Holly; stem 10–24 in., erect, cladodes very stiff, ending in a short spine, berry bright red; stony thickets; Southern Switzerland, Jura, Savoy, Dauphiny, Pyrenees, rare.

7. Lloydia, Salisb.

Flowers erect, white or yellow, solitary; stem usually simple, leafy, springing from a small scaly bulb; leaves linear; seed-vessel a 3-celled capsule.

L. serotina, Rchb. (Pl. 113); stem 2–8 in., flowers solitary, milk-white with yellowish base and three red streaks, leaves linear; rocky places, very high.

8. Lilium, L.

Flowers large, white, yellow, or red; sepals and petals distinct; stem leafy, springing from a bulb covered with

GAGEA LLOYDIA SEROTINA

fleshy scales; anthers dorsifixed; leaves alternate or in whorls; radical leaves 0; seed-vessel a 3-celled capsule.

A. Flowers erect, bell- or funnel-shaped:—*L. bulbiferum*, L.; flowers orange or yellowish-red, upper leaves with axillary bulbils; rocky places; Grisons, Jura, very rare. *L. croceum*, Chaix; flowers yellowish-red with purple spots, leaves without axillary bulbils; rocky places; Switzerland, Jura, Dauphiny, rare.

B. Flowers pendant, with recurved perianth-leaves:—*L. Martagon*, L., Turk's-cap Lily; flowers pink or lilac spotted with dark purple, fragrant at night, leaves in whorls; mountain woods, frequent. *L. carniolicum*, L.; flowers scarlet or yellow with dark brown warts, leaves alternate; Styria, Carniola, Carinthia, local. *L. pyrenaicum*, Gou.; flowers yellow spotted with black, stem stout, leafy almost to the summit, leaves narrowly lanceolate or almost linear, in whorls, very crowded; Pyrenees.

9. Erythronium, L.

Flowers solitary on a leafless scape; perianth-leaves strongly reflexed; leaves all radical; seed-vessel a 3-celled capsule.

E. dens-canis, L., Dog's-tooth Violet; flowers pink or white, leaves 2, elliptic, spotted with red; thickets, local; Ticino, Geneva, Jura, Southern Tirol (Monte Baldo), Carinthia, Styria, Carniola, Puy-de-Dôme, Pyrenees.

10. Asphodelus, L.

Flowers white, numerous; perianth-leaves spreading; stamens hypogynous, filaments ciliated, dilated at the base.

A. albus, Mill.; flowers in a compact spike, stem 3–6 ft., simple, leafless; Southern Switzerland, very rare (Valais, Monte Generoso), Pyrenees. *A. ramosus*, L.; stem 1½–3 ft., branched above, flowers much smaller, in panicles formed of loose spikes; high; Pyrenees, Dauphiny.

11. Anthericum, L.

Flowers white, in a lax terminal raceme, on a leafless scape springing from a tuberous root-stock; sepals and petals distinct, spreading; leaves narrow.

A. ramosum, L.; panicle branched, flowers distant, stem 1½–2 ft., slender, leaves linear, channelled, shorter than the stem; mountain woods, frequent. *A. Liliago*, L.; flowers larger (about 1 in.), raceme not branched, stem 4–18 in.; open hill-sides; Switzerland, Jura, Pyrenees.

12. Paradisia, Mazz.

Flowers large, funnel-shaped, white, in a terminal unilateral raceme on a leafless scape; leaves very narrow; ovary shortly stalked.

P. Liliastrum, Bert. (*Anthericum Liliastrum*, L.) (Pl. 114); flowers very large (2 in.), milk-white, racemes 2–8-flowered, leaves linear, as long as the stem, stem 12–18 in.; alpine pastures, rare; Valais, Jura (Dôle), Tirol, Carniola, Carinthia, Dauphiny, Pyrenees.

13. Allium, L.

Flowers in umbels surrounded by a membranous spathe, on a usually leafless scape springing from a tunicated bulb; sepals and petals distinct; seed-vessel

CXIV. – PARADISIA LILIASTRUM.

a 3-celled few-seeded capsule; plants with a strong smell of garlic (Onions).

A. Filaments of the three inner stamens 3-toothed, the central tooth bearing the anther; leaves flat:—*A. Scorodoprasum*, L.; perianth-segments purple with white margin, umbel with purple stalked bulbils, leaves keeled; hedges; Bâle, Aargau, Geneva, Dauphiny, Vosges, Pyrenees. *A. rotundum*, L.; flowers purple, umbel without bulbils, leaves narrowly linear; among corn; Schaffhausen, Bâle, Geneva.

B. Filaments as in *A.*; leaves cylindrical, hollow:—*A. vineale*, L.; umbel small, flowers green or pink, sometimes entirely replaced by bulbils; cultivated land, frequent. *A. sphærocephalum*, L. (including *descendens*, L.); umbels large, spherical, without bulbils, flowers purple; dry hills, frequent.

C. Filaments not toothed (or teeth very short); leaves flat:—*A. ursinum*, L., Ramsons; umbel nearly flat, without bulbils, flowers white, scape nearly leafless, radical leaves ovate-lanceolate; thickets and hedges, common. *A. Victorialis*, L.; umbel globular, with sessile bulbils, flowers greenish-white, scape leafy, leaves ovate-lanceolate; high rocky slopes, frequent.

D. Filaments as in *C.*; leaves cylindrical:—*A. Schœnoprasum*, L., Chives; umbel dense, globular, without bulbils; flowers campanulate, light purple, stamens included, anthers yellow; moist meadows, frequent. *A. foliosum*, Clar.; resembling the last, but a taller plant with lilac anthers; moist alpine pastures. *A. ochroleucum*, Koch (including *ericetorum*, Thor., *suaveolens*, Dub., and *strictum*, Schrad.); umbel globular, with or without bulbils, flowers yellowish-white or light pink, stamens longer than

the perianth-segments, anthers yellow; dry hill-sides, frequent. *A. oleraceum*, L., Field-garlic; umbel globular, with bulbils, spathe longer than the umbel, flowers whitish-green, stamens included; fields, frequent. *A. carinatum*, L.; resembling *oleraceum*, but flowers bright pink, filaments much longer than perianth-lobes, leaves flatter; dry places, not common. *A. pulchellum*, Don (*paniculatum*, Gaud.), resembling the last, but umbel without bulbils; Western Switzerland, Ticino, Jura, Pyrenees. *A. flavum*, L.; flowers yellow, umbel without bulbils, anthers exserted; Jura, Auvergne, Puy-de-Dôme, Pyrenees.

E. Root-stock a horizontal rhizome, with the bulbs on its upper surface; umbel without bulbils:—*A. narcissiflorum*, Vill. (*grandiflorum*, Lam.); umbel few-flowered, flowers very large (about $\frac{1}{2}$ in.), pink or white, drooping, stamens included, leaves linear, flat; high; Dauphiny, Pyrenees. *A. fallax*, Don (including *acutangulum*, Schrad., and *angulosum*, DC.); flowers small, numerous, light purple, stamens about as long as perianth-segments, stem 12–18 in., leaves linear, flat; Ticino, Western Switzerland, Jura, Pyrenees. *A. montanum*, Schm.; flowers small, pink, anthers extruded, stem leafless, 8–10 in., leaves angular; rocky places; Switzerland, rare.

Several other species are escapes from cultivation.

14. Gagea, L.

Flowers yellow, in umbels subtended by leafy bracts, on a leafless scape springing from a bulb; stamens attached to the base of the perianth-leaves; anthers basifixed.

G. lutea, Ker, Yellow Star of Bethlehem; bulb soli-

tary, radical leaf solitary, linear-lanceolate, flat, flower-stalks smooth; woods, not uncommon. *G. Liottardi*, Schult.; flowers 1–5, flower-stalks villous, bracts 2, opposite, radical leaves 1–2, tubular, bulbs 2; damp alpine pastures, frequent. *G. pratensis*, Schult. (*stenopetala*, Fr.); bulbs 2–3, without a common envelope, flowers 2–5, stalk glabrous, radical leaf solitary, linear; grassy places; Switzerland, Tirol, Lombardy, local. *G. arvensis*, Dum.; bulbs 2, enclosed in a common envelope, flowers 2–20, radical leaves usually 2, linear, channelled; fields and pastures, not uncommon. *G. minima*, Schult.; flowers 2–5, perianth-segments acuminate, flower-stalk glabrous, bract solitary, radical leaf solitary, linear, bulbs 2; alpine pastures; Switzerland, rare. *G. saxatilis*, Koch; flowers 1–5, perianth-segments obtuse, radical leaves setaceous; dry hills; Valais, rare.

15. Ornithogalum, L.

Flowers white or yellow, in racemes or corymbs, on a leafless scape springing from a bulb; stamens hypogynous, anthers dorsifixed; sepals and petals distinct; leaves all radical, linear.

O. nutans, L.; flowers large, white, with a green midrib to each perianth-leaf, 5–9 in a unilateral raceme, filaments 3-fid; lowland meadows and orchards. *O. pyrenaicum*, L.; flowers greenish-yellow, smaller, very numerous, in an elongated raceme, filaments entire, dilated; mountain woods, frequent. *O. umbellatum*, L., Star of Bethlehem; flowers white, 5–20, crowded in a short umbel-like raceme, filaments not 3-cleft; copses and fields, frequent.

16. Scilla, L.

Flowers blue or rarely pink, few, in a short raceme, on a short leafless scape springing from a small bulb; sepals and petals distinct, spreading; filaments flattened; seed-vessel a 3-celled few-seeded capsule.

S. bifolia, L. (Pl. 115); flowers 2–5 on erect flower-stalks, bracts 0, stem 4–8 in., glabrous, leaves 2, lanceolate; woods and orchards, frequent. *S. italica*, L.; flowers more numerous, each subtended by two linear-lanceolate bracts, stem 8–12 in., leaves 2–5, linear-lanceolate; rare; Bern, Valais, Dauphiny. *S. verna*, Huds., Squill; raceme very short, few-flowered, each flower subtended by one linear-lanceolate bract, stem 8–12 in., leaves numerous, broadly lanceolate, recurved; high pastures; Pyrenees.

Our English Blue-bell or Wild Hyacinth (*Scilla nutans*, Sm., *Agraphis nutans*, Lk.) occurs at low elevations in the Pyrenees, but is entirely absent from Switzerland.

17. Muscari, Tourn.

Flowers very small, blue, globose, in a dense raceme on a leafless scape springing from a small bulb; perianth-leaves all united below; stamens attached to the middle of the corolla-tube, filaments very short. Not alpine.

M. comosum, Mill., Grape-Hyacinth; racemes at first dense, afterwards much elongated, flower-stalks horizontal, longer than the flower, many of the flowers often sterile, stem 12–18 in., leaves channelled; grassy slopes; Southern and Western Switzerland, Pyrenees. *M. botry-*

CXV.—SCILLA BIFOLIA.

oides, DC.; leaves 2–3, broader towards the tip, erect; orchards and slopes; Switzerland, Jura, Dauphiny, occasional. *M. racemosum*, DC.; flowers fragrant, upper ones often imperfect, leaves prostrate, grooved above; grassy slopes; Switzerland, Jura, Pyrenees. *M. neglectum*, Guss.; plant more robust, flowers larger, leaves broader, more deeply channelled; vineyards; Bâle, Winterthur.

18. Hemerocallis, L.

Flowers large, funnel-shaped, in loose spikes; perianth-leaves united at the base into a long tube; stamens inserted in the throat of the perianth, anthers dorsifixed; root tuberous.

H. fulva, L.; flowers very large (4 in. long), reddish-yellow variegated with purple, sharply veined transversely, leaves broadly linear; orchards; Rhone Valley, Tirol, Lombardy, Carinthia, Salzburg. *H. flava*, L., flowers smaller (3 in. long), yellow, scented, not veined transversely, leaves narrowly linear; orchards; Lindau, Bregenz, Piedmont, Lombardy, Styria, Carinthia, Pyrenees.

19. Tulipa, L.

Flowers very large, solitary, on a leafy scape; sepals and petals distinct; stamens hypogynous, anthers basifixed; stigma sessile, with radiating lobes; leaves broad. Not alpine.

T. sylvestris, L., Tulip; flowers yellow; meadows and vineyards; Switzerland, Jura, Pyrenees, not common. *T. Didieri*, Jord.; flowers deep purple with a black spot at the base of each perianth-leaf; Sion.

20. Fritillaria, L.

Flowers large, solitary or few, bell-shaped, drooping, on leafy scapes; sepals and petals distinct; anthers dorsi-fixed; styles 3; leaves narrow.

F. Meleagris, L., Fritillary, Snake's-Head (Pl. 116); flowers solitary, yellow or variegated with purple, 1½ in. long, stem 10–18 in., leaves linear; damp meadows; Neuchâtel, Jura, Savoy, Carinthia, Styria, Pyrenees. *F. pyrenaica*, L.; flowers yellow- or purple-brown, petals larger than the lanceolate sepals, leaves lanceolate, broader than in the last; Pyrenees. *F. delphinensis*, Gren.; resembling the last, but sepals oblong, stem-leaves numerous; high; Dauphiny. *F. involucrata*, All.; perianth-leaves all oblong and submucronate, leaves linear-lanceolate, mostly opposite, a whorl of three beneath the flower; Dauphiny.

Order LXXXIX.—JUNCACEÆ.

Flowers small, bisexual, in axillary or terminal cymes; sepals and petals 3 each, distinct, brown or green; stamens 6, rarely 3; ovary superior; stigmas 3, feathery; seed-vessel a 1–3-celled capsule; stem smooth, pithy; leaves very narrow.

1. Juncus, L.

Sepals keeled; ovary 3-celled with axile, rarely 1-celled with parietal ovules. Very glabrous plants, with usually cylindrical leaves and pithy stem.

Most of the lowland English species of Rush are found also in Switzerland, viz.:—*J. effusus*, L. (*communis*,

CXVI.—FRITILLARIA MELEAGRIS.

Mey.), *conglomeratus*, L., *glaucus*, Ehrh., *obtusiflorus*, L., *compressus*, Jacq., and *lamprocarpus*, Ehrh.

The following are not British, or are more or less alpine :—

A. Stem leafless :—*J. filiformis*, L. ; flowers brownish-green, cyme in nearly the middle of the stem ; wet places, high, frequent. *J. arcticus*, Willd. ; flowers dark brown, cyme in the upper part of the stem ; moist, local ; Upper Engadine, Saas, Zermatt, Tirol, Dauphiny, Pyrenees. *J. triglumis*, L. ; cyme terminal, flowers few (2–4), surrounded by brown bracts, stem slender, 3–5 in. ; moist alpine pastures, frequent. *J. squarrosus*, L. ; flowers numerous, in branched terminal cymes, stem 8–12 in., rigid ; Ormonds, St. Gothard, Jura, Lombardy, Pyrenees. *J. capitatus*, Weig. ; annual, sepals and petals acuminate, longer than the fruit ; rare ; Valais, Jura, Pyrenees.

B. Stem more or less leafy :—*J. trifidus*, L. ; leaves with a slit and ciliate ligule at the mouth of the sheath, radical leaves very short ; high, frequent. *J. Hostii*, Tausch. ; resembling the last, but radical leaves much longer, stem-leaf often only one ; high, frequent. *J. alpinus*, Vill. ; leaves hollow, septated, branches of cyme erect, perianth-leaves all blunt ; moist meadows, common. *J. Wulfeni*, Saut. ; resembling the last, but perianth-leaves acuminate, the inner ones longer, curved downwards ; Salzburg, rare. *J. affinis*, Gaud. ; similar, but stem more leafy, perianth-leaves nearly equal, outer ones acute, inner blunt ; Tirol, Salzburg, rare. *J. Jacquini*, L. ; cyme single, 4–10 flowered, stem with a single linear-subulate septated leaf ; dry, frequent. *J. stygius*, L. ; stem slender, cymes 1–3, leaves flat, flowers pale-green ; peat-mosses, very rare ; Einsiedeln, Zug, Tirol, Carinthia.

J. castaneus, Sm.; cymes 1–3, flowers chestnut-coloured, leaves flat; moist, rare; Grisons, Tirol, Carinthia, Styria, Salzburg. *J. supinus*, Moench.; stem 2–10 in., often decumbent, flowers often replaced by tufts of leaves, stamens 3; wet places, frequent. *J. sylvaticus*, Rchb.; stem erect, perianth-segments acuminate, capsule acuminate-mucronate; wet places; Switzerland, Jura, rare. *J. Gerardi*, Lois; flowers distinct, capsule strongly mucronate; salt marshes. *J. bufonius*, L., Toad-Rush; flowers solitary or in bunches of 2–3, green, perianth-segments very unequal, acuminate, stamens often 3, whole plant very pale green; wet places, common. *J. Tenageia*, Ehrh.; similar, but perianth brown, capsule nearly globular; rare; Bâle, Jura, Ticino, Styria, Pyrenees.

2. Luzula, DC.

Ovary 1-celled, with 3 erect ovules; stamens 6; leaves narrow, grass-like, not cylindrical, always more or less ciliate with long white hairs.

L. campestris, Willd., is a very common plant on dry banks; and *L. maxima*, DC. (*sylvatica*, Gaud.), Wood-Rush, a tall plant with very compound cymes; in woods; also *L. vernalis*, DC. (*pilosa*, Willd.), and *L. Forsteri*, DC.; more slender plants in woods, not so common. The following are alpine or sub-alpine:—

A. Flowers solitary, distant, stalked:—*L. flavescens*, Gaud.; flowers yellowish; mountain woods, frequent.

B. Flowers in clusters, forming a connected spicate cyme:—*L. albida*, DC. (including *angustifolia*, Garck., and *nemorosa*, Poll.); flowers large, white or copper-coloured, cyme lax; woods, frequent. *L. nivea.*, DC.

flowers white, silvery, large, cyme dense; mountain woods, local. *L. Sieberi*, Tausch.; resembling *sylvatica*, but smaller, leaves more hairy; high. *L. spadicea*, DC.; cyme lax, flowers black-brown, leaves linear, bearded at the base; alpine pastures, frequent. *L. lutea*, DC.; leaves glabrous, linear-lanceolate, cyme spreading, flowers golden-yellow; alpine pastures, frequent. *L. glabrata*, Koch; cyme lax, flowers black-brown with white margin, leaves shortly lanceolate; dry; Tirol, Styria, Salzburg.

C. Flowers in spikelets, forming a cyme, panicle, or umbel:—*L. spicata*, DC.; spikes forming a drooping umbel, flowers dark brown, leaves linear; alpine pastures, frequent. *L. multiflora*, Lej. (including *alpina*, Hoppe, and *nigricans*, Desv.); cæspitose, spikelets black-brown, forming an umbel, leaves linear, hairy; alpine pastures, frequent. *L. pediformis*, DC.; flowers forming an oblong drooping spike, leaves linear, stem 18–24 in.; Dauphiny, Mont Cenis, Pyrenees.

Order XC.—MELANTHACEÆ.

Resembling *Liliaceæ*, but root-stock a corm or creeping rhizome; anthers bursting laterally or outwardly. Distribution similar.

1. COLCHICUM, L.

Flowers solitary or in clusters, springing from a fleshy corm; perianth with a very long tube; stamens 6; leaves all radical. (Closely resembling *Crocus*, but with a superior ovary.)

C. autumnale, L., Meadow Saffron, Autumn Crocus;

leaves lanceolate, flowers pale purple, sepals lanceolate-oblong; meadows, common. *C. alpinum*, DC.; flowers pink or lilac, sepals linear-elliptic, leaves linear-lanceolate; Valais, Ticino, Savoy, Tirol, Piedmont, Dauphiny.

2. Bulbocodium, L.

Perianth-segments spreading, united at the throat by small scales; stamens 6; styles 3, united nearly to the summit.

B. vernum, L. (Pl. 117); flowers pink or white, appearing with the lanceolate concave leaves; meadows, rare; Valais, Savoy, Piedmont, Dauphiny.

3. Merendera, Ram.

Resembling *Bulbocodium*, but styles distinct.

M. Bulbocodium, Ram.; flowers pink, perianth-segments distinct nearly to the base, leaves linear, not appearing with the flowers; pastures, Pyrenees.

4. Veratrum, L.

Flowers in branched panicles, sometimes unisexual; stem leafy, springing from a creeping rhizome; leaves oval, with very strong nerves.

V. album, L. (including *Lobelianum*, Bernh.); flowers white or greenish, perianth-segments longer than the flower-stalk, leaves downy beneath; pastures, frequent. *V. nigrum*, L.; flowers very dark red, perianth-segments not longer than flower-stalk, leaves glabrous; rare, Ticino, Carniola, Styria.

CXVII.—BULBOCODIUM VERNUM.

5. Tofieldia, Huds.

Flowers small, in spikes or racemes at the end of a slender leafless scape; leaves linear; seed-vessel composed of 3 follicles.

T. calyculata, Whlb.; flowers yellow or reddish, subtended by a calyx-like involucre; damp pastures, frequent. *T. palustris*, Huds.; involucral scales at the base of the flower-stalk, but not beneath the flower, spike shorter; damp pastures, not so common.

Order XCI.—ALISMACEÆ.

Flowers usually bisexual, in panicles or umbels; sepals and petals 3 each, the former green or coloured; stamens 6 or more; ovary of many carpels; leaves chiefly radical. Aquatic or marsh plants; not alpine.

1. Alisma, L.

Flowers bisexual; sepals green; petals white or light pink; carpels very numerous, free; leaves erect.

A. Plantago, L., Water-Plantain; flowers in a branched panicle, carpels arranged in a whorl, stem 1–3 ft., leaves ovate-lanceolate; ditches, common. *A. ranunculoides*, L.; flowers in an umbel, carpels arranged in a globular head, stem 6–18 in., leaves linear-lanceolate; ditches; Switzerland, rare. *A. parnassifolium*, L.; flowers in a panicle, leaves obtuse, cordate; Tirol, Carinthia, Styria, Dauphiny.

2. Sagittaria, L.

Flowers unisexual, in whorls; sepals green; petals white; stamens numerous; leaves erect, arrow-shaped, thick, very shining

S. sagittæfolia, L., Arrow-head; ditches; Switzerland, rare.

3. Butomus, L.

Flowers bisexual, in umbels subtended by an involucre; sepals and petals pink; stamens 9; carpels 6.

B. umbellatus, L., Flowering Rush; stem 6–12 in., flowers 1 in. diameter, leaves linear, erect; ponds and streams; very rare (Bâle).

Order XCII.—TYPHACEÆ.

Flowers monœcious, in globular or cylindrical spikes or heads; perianth reduced to membranous scales or hairs; ovary 1-celled, with usually one pendulous ovule; leaves narrow, with sheathing base; root-stock a creeping rhizome. Aquatic or marsh plants.

1. Sparganium, L.

Heads globose, subtended by leafy bracts; perianth of 3–6 membranous scales; fruit a small 1–2-celled drupe.

S. ramosum, Huds., Bur-Reed; stem erect, branched, leaves triquetrous; ditches, common. *S. simplex*, Huds.; stem erect, simple; and *S. minimum*, Fr. (including *natans*, Koch, and *affine*, Schn.); stem and leaves floating; not so common.

2. Typha, L.

Spikes very dense, brown, cylindrical, with deciduous leafy bracts; stamens several; monadelphous; ovaries stalked, often imperfect.

T. latifolia, L., Greater Reed-Mace (often called Bulrush); stem 3–6 ft., spikes 6–12 in. long, 1 in. diameter; ditches and ponds, frequent. *T. angustifolia*, L., Smaller Reed-Mace; leaves narrower, spike $\frac{1}{2}$–$\frac{3}{4}$ in. diameter, not continuous; not so common. *T. minima*, Hfn. (*Laxmanni*, Lep.); stem 1–3 ft., stem-leaves very small, scale-like; water-sides, occasional. *T. Shuttleworthii*, Koch; inflorescence composed of two contiguous grey spikes; Switzerland, Dauphiny, occasional.

Order XCIII.—NAIADEÆ.

Flowers unisexual or bisexual, inconspicuous; perianth 0 or 3–4-lobed, inferior; ovary of 1–4 carpels, with one seed in each carpel. Aquatic or marsh plants, usually with floating leaves sheathing at the base.

1. Potamogeton, L.

Flowers bisexual, in axillary or terminal spikes; perianth-segments 4, green; stamens 4; carpels usually 4; leaves submerged and translucent, or floating and opaque, often with connate stipules.

No species of Pond-Weed are truly alpine, though some are found at considerable altitudes. The species are often difficult to distinguish, and require more minute descriptions than can be given here. The following are given

by Gremli as natives of Switzerland, all being also British plants: — *P. densus*, L., leaves opposite; *natans*, L., floating leaves thick, coriaceous; *fluitans*, Roth; *coloratus*, Vahl (*plantagineus*, Ducr., *Hornemanni*, Koch); *rufescens*, Schrad. (*alpinus*, Balb.); *gramineus*, L. (*heterophyllus*, Schreb.), submerged leaves linear-lanceolate; *lucens*, L., leaves very large and shining; *Zizii*, Roth.; *crispus*, L., leaves crisp, wavy; *perfoliatus*, L., leaves cordate-amplexicaul; *prælongus*, Wulf., leaves oblong, half-amplexicaul; *decipiens*, Nol.; *pectinatus*, L., leaves very long, filiform; *marinus*, All., spikes on long stalks, alpine lakes; *compressus*, L. (*zosteræfolius*, Sch.), stem winged, leaves linear, half-amplexicaul; *acutifolius*, Link.; *obtusifolius*, M. K.; *mucronatus*, Schr.; *pusillus*, L., spike very few-flowered.

2. Zannichellia, L.

Flowers minute, solitary or in pairs, axillary, in a cuplike sheath; leaves submerged, linear.

Z. palustris, L. (including *pedunculata*, Rchb.), Horned Pond-Weed; stem very slender, leaves opposite; stagnant water; Switzerland, rare.

3. Naias, L.

Flowers unisexual, solitary or few, enclosed in sheaths; perianth 0; stamen 1; carpel 1, with 1 ovule; leaves linear, very narrow.

N. major, All. (*marina*, L.); flowers dicœcious, solitary, leaves dentate-spiny; stagnant water; Switzerland, Pyrenees, rare. *N. minor*, All. (*Caulinia fragilis*, Willd.); flowers moncœcious, solitary or few, leaves nearly entire,

a very fragile plant; stagnant water; Switzerland, Pyrenees, rare.

Order XCIV.—JUNCAGINEÆ.

Resembling Naiadeæ; but leaves erect, rush-like. Marsh plants.

1. TRIGLOCHIN, L.

Flowers in racemes, small, green, without bracts, on leafless scapes; leaves very narrow; fruit composed of 3–6 3-pointed carpels.

T. palustre, L.; carpels 3, leaves filiform; marshes; Switzerland, Jura, frequent.

2. SCHEUCHZERIA, L.

Flowers in racemes, small, green, bracteate, on leafy scapes; leaves slender; fruit composed of 2–3 inflated follicles.

S. palustris, L.; scape curved, leaves with dilated brown sheaths and a pore at the tip; sub-alpine marshes, frequent.

Order XCV.—SMILACEÆ.

Flowers unisexual or bisexual, regular; sepals, petals, and stamens 8–10; sepals green or coloured; ovary superior; leaves net-veined. A tropical order, with very few European representatives; not alpine.

1. PARIS, L.

Flower solitary; sepals green; stem simple; leaves in whorls, net-veined; stamens 8–12; fruit a berry.

P. quadrifolia, L., Herb-Paris; flowers terminal, about 1½ in. diam., sepals green, acuminate, petals yellow, stem 6–12 in., bearing a whorl of usually 4 ovate leaves, berry large, black; mountain woods, frequent.

Order XCVI.—DIOSCOREÆ.

Flowers small, unisexual, in axillary racemes or panicles; sepals and petals green; stamens 6; ovary inferior, 3-celled. Climbing shrubs with net-veined leaves. A tropical order, with only two representatives in Europe.

1. TAMUS, L.

Perianth campanulate, green.

T. communis, L., Black Bryony; leaves ovate-cordate, acuminate, shining, berry red; hedges; Switzerland, Pyrenees.

Order XCVIII.—AROIDEÆ.

Flowers in a spadix enclosed in a leafy spathe; perianth 0; fruit a berry; leaves often net-veined. A large tropical order, with very few European representatives.

1. ARUM, L.

Spadix terminated by a naked cylindrical column; female flowers at the bottom of the spike, consisting of nothing but ovaries; surmounted by the male flowers, consisting of nothing but sessile anthers; and above them neuter flowers; leaves all radical, thick, shining, sagittate, net-veined.

A. maculatum, L., Cuckoo-Pint, Lords-and-Ladies; leaves spotted, appearing in the spring, spadix violet; hedge-banks; Switzerland, Pyrenees. *A. italicum*, Mill.; spadix yellow, leaves not always spotted; Ticino, Pyrenees.

2. CALLA, L.

Spadix entirely covered with flowers; anthers on long filaments.

C. palustris, L.; leaves cordate, spathe white inside; marshes; Lucerne, Vosges.

3. ACORUS, L.

Perianth-segments membranous; stamens 6.

A. Calamus, L.; Sweet-Flag; leaves ensiform; wet places, rare.

Order XCIX.—LEMNACEÆ.

Perianth 0; stem and leaves reduced to floating green disks. Aquatic plants; not alpine.

1. LEMNA, L.

Our four species of Duckweed, *L. minor*, L., *gibba*, L., *trisulca*, L., and *polyrhiza*, L., all occur in Switzerland, though the first only is common; they are very rarely seen in flower.

2. WOLFFIA, Hork.

An extremely minute floating plant, resembling *Lemna*, but much smaller; perianth 0.

W. arhiza, Wimm.; the smallest European flowering plant; Switzerland, very rare.

Class VI.—GLUMIFERÆ.

Perianth 0, or of bristles or very minute scales. (Orders C.–CI.)

Order C.—CYPERACEÆ.

Flowers unisexual or bisexual; perianth 0 or composed of bristles; stamens 1–6; stigmas 2–3; grassy or reed-like herbs, with solid, usually triangular stem; the leaves very narrow, with closed sheaths. A very large order, belonging to all climates.

1. Cyperus, L.

Flowers bisexual, in compound umbels or panicles; perianth 0.

C. longus, L.; perennial, stem 2–3 ft., stigmas 3; by water, rare; Switzerland, Tirol, Pyrenees. *C. Monti*, L.; similar, but stigmas 2; rare; Ticino, Pyrenees. *C. flavescens*, L.; annual, stem 2–8 in., flowers yellowish, stigmas 2; wet places; Switzerland, Jura, Pyrenees. *C. fuscus*, L.; annual, stem 2–8 in., flowers dark brown, stigmas 3; wet places; Switzerland, Jura, Pyrenees.

2. Heleocharis,* L.

Flowers bisexual; spikelet solitary, terminal; perianth of 3–8 bristles. Small marsh plants.

H. palustris, R. Br. (including *uniglumis*, Lk.); wet

* Often spelt *Eleocharis*.

places, very common. *H. acicularis*, R. Br.; stem very slender, almost square, stigmas 3; Switzerland, Jura. *H. ovata*, R. Br.; annual, spikelets many-flowered, achenes yellowish; Switzerland, Jura, very rare. *H. Lereschii*, Thom.; annual, spikelets few-flowered, achenes black; Switzerland, very rare (Lausanne).

3. Scirpus, L.

Flowers bisexual; spikelets usually collected into heads; perianth 0 or of 3–8 bristles. Tall water or smaller marsh plants.

The only Swiss species which are not British are:—*S. alpinus*, Schleich.; stem 2–3 in., nearly leafless, spikelet solitary, terminal, perianth 0, stigmas 3; very high, rare; Engadine, Zermatt, Simplon, Mont Cenis. *S. mucronatus*, L.; stem angular, 1½–2½ ft., spikelets sessile, bristles present; bogs, rare. *S. supinus*, L.; stem 2–8 in., cylindrical, spikelets in clusters, perianth-bristles 0; very rare; Lake of Geneva, Lombardy.

The following are British species:—

A. Spikelets large; stem leafless:—*S. lacustris*, L., Bulrush (including *Tabernæmontani*, Gmel., and *carinatus*, Sm.); stem 1–8 ft., cymes terminal, branched; *S. triqueter*, L. (*trigonus*, Roth); stem triquetrous; *S. pungens*, Vahl; similar but more slender; all by water-sides.

B. Spikelets large; stem leafy; cymes terminal, leafy:—*S. maritimus*, L.; stem 1–3 ft., leaves ½ in. broad, spikelets brown; by water. *S. sylvaticus*, L.; stem 1–3 ft., leaves flat, cyme very large; moist woods.

C. Spikelets small, lateral; perianth-bristles 0:—*S. setaceus*, L.; stem very slender, spikelets 1–3; ditches.

S. Holoschœnus, L.; spikelets in compact globose cymose heads; wet places, rare.

D. Spikelets small, terminal, solitary; bristles 3–8:—*S. cæspitosus*, L.; stems 6–12 in., very cæspitose, bristles longer than the fruit; *S. pauciflorus*, Lightf.; resembling the last, but stem leafless; *S. parvulus*, R. and S.; very dwarf, 1–2 in., spikelets of 3–4 very small flowers; all in wet sandy places, the last very rare.

E. Spikelets in a distichous spike:—*S. compressus*, Pers. (*S. Caricis*, Retz.; *Blysmus compressus*, Panz.); stigmas 2; wet meadows.

4. Fimbristylis, Vahl.

Flowers bisexual; style dilated at the base and persistent.

F. laxa, Vahl; stem leafy, spikelets 3–5; very rare; marshes; Ticino.

5. Eriophorum, L.

Flowers bisexual; perianth-bristles very long and slender, cottony.

A. Spikelets several, drooping, in lateral cymes:—*E. polystachion*, L. (including *angustifolium*, Roth, and *latifolium*, Hoppe), Cotton-Grass; marshy meadows, very common. *E. minus*, Koch, is a mountain form. *E. gracile*, Koch; very similar, but more slender, with narrower leaves; peat-bogs.

B. Spikelet solitary, terminal:—*E. alpinum*, L. (Pl. 118); stem 6–10 in., very slender, head snow-white, perianth-bristles wavy; moist alpine pastures, frequent. *E. vaginatum*, L.; heads snow-white, perianth-bristles

CXVIII.—ERIOPHORUM ALPINUM

straight, stem trigonous; peat-bogs, frequent. *E. Scheuchzeri*, Hoppe; heads dark grey, perianth-bristles, straight, stem cylindrical; high, frequent.

6. Rhynchospora, Vahl.

Flowers unisexual or bisexual; spikelets terete, in axillary and terminal panicles or corymbs; bristles 6 or more.

R. alba, Vahl; spikelets white, stamens 2; *R. fusca*, R. and S.; spikelets dark brown, stamens 3; both in bogs, frequent.

7. Cladium, R. Br.

Flowers mostly bisexual; bristles 0; spikelets in panicles or cymes; leaves rigid, glaucous.

C. Mariscus, Br. (*germanicum*, Schrad.); stem 2–3 ft., leaves denticulate, with very sharp edges and keel; marshes; Switzerland, Jura, Pyrenees; not common.

8. Schœnus, L.

Spikelets in compressed terminal bracteate heads; flowers very few, bisexual; bristles 1–6; stamens 3.

S. nigricans, L.; stem 12–18 in., spikelets 5–10, blackish-brown; *S. ferrugineus*, L.; stem 6–12 in., spikelets 2–3, rusty-brown; both frequent in bogs.

9. Elyna, Schrad.

Spikelets 2-flowered in a terminal spike; each flower with a large scale-like bract at its base, unisexual.

E. spicata, Schrad. (*Bellardi*, Degl.); leaves semi-

circular, furrowed, spikelets brown; very high, moist; Switzerland, Styria.

10. Kobresia, Willd.

Flowers unisexual; spikelets few-flowered, in a terminal compressed ovoid spike.

K. caricina, Willd.; stem 4–8 in., lower spikelets of one female, upper usually of 2 male flowers; very high; Switzerland, Tirol, Mont Cenis, Styria, Pyrenees, rare.

11. Carex, L.

Flowers unisexual, usually monœcious; male flowers without perianth-bristles; stamens 2–3; female flowers enclosed in a bidentate sac or utricle; stigmas 2–3; seed-vessel enclosed in the enlarged sac or perigyne.

The following enumeration of the alpine species of the very difficult genus of Sedges is founded on Dalla-Torre's classification.

A. Spikelet solitary, terminal, without bracts at the base; stem nearly leafless:—*C. dioica*, L.; spikelet dicœcious, stigmas 2, stem terete, 3–8 in.; moist. *C. Davalliana*, Sm.; dicœcious, stigmas 2, stem triangular, up to 1 ft.; moist. *C. rupestris*, All.; lower flowers of spikelet female, upper male, fruit erect; pastures. *C. pauciflora*, Lightf.; spikelet similar, 4–6-flowered, fruit bent downwards; moist. *C. microglochin*, Whlb.; spikelet similar, 10–12-flowered, fruit bent downwards, with a long green bristle at the base; Valais.

B. Spikelets united into a head, with 2–3 green involucral leaves at its base:—*C. baldensis*, L.; rare; Southern Tirol, Salzburg, Upper Bavaria.

C. Inflorescence a spike, raceme, or panicle, consisting of small few-flowered spikelets, composed of male and female flowers; stem leafless.

(*a.*) Stigmas 3:—*C. curvula*, All.; moist, rare.

(*b.*) Stigmas 2; lower flowers female, upper male:—*C. incurva*, L.; root-stock stoloniferous, fruit inflated; pastures, local. *C. fœtida*, All.; head compact, globular, red-brown; Switzerland, Tirol, Salzburg, rare. *C. Laggeri*, Wimm.; spike ovate-lanceolate, dark red-brown; very rare (Grimsel). *C. microstyla*, Gay; stem slender, spike elliptic, few-flowered; Switzerland, Salzburg, rare.

(*c.*) Stigmas 2; lower flowers male, upper female:—*C. macilenta*, Fr.; root-stock stoloniferous; calcareous hills. *C. leporina*, L.; spikelets crowded, ovate, fruit winged; pastures. *C. lagopina*, Whlb.; spikelets round, fruit not winged; pastures. *C. Grypus*, Schk. (*stellulata*, Good.); spikelets distant, forming an interrupted spike; peat-bogs. *C. elongata*, L.; spikelets linear or elliptic, forming an interrupted distichous spike; moist, local. *C. Persoonii*, Sieb.; stem 6–12 in., rough, spikelets 5–8, brown and green; moist. *C. canescens*, L.; stem 2–4 in., rough, spikelets usually 6, pale green; moist. *C. tetrastachya*, Traunst.; stem rough, spikelets 4; Tirol, very rare.

D. Inflorescence composed of one or more terminal male spikelets, beneath which are one or more (usually stalked) female spikelets; stigmas 2:—*C. mucronata*, All.; fruit lanceolate, leaves setaceous; moist. *C. bicolor*, All.; fruit elliptic, not beaked; very high. *C. vulgaris*, Fr.; fruit obovate, beaked, leaves narrowly linear; moist. *C. rigida*, Good.; fruit elliptic, not beaked, leaves broadly linear; Tirol, very rare.

E. Inflorescence similar; stigmas 3.

(*a.*) Terminal spikelet male in the lower, female in the upper half; leaves flat, linear:—*C. fuliginosa*, Schk.; fruit lanceolate, beaked (elliptic, not beaked, in the remainder); dry. *C. alpina*, L. (*Vahlii*, Schk.; spikelets short, crowded, fruit green; dry, local. *C. nigra*, All.; spikelets short, crowded, fruit black; dry, local. *C. atrata*, L.; spikelets 3–5, distant, very dark, stem 8–15 in., leafy; pastures. *C. aterrima*, Hoppe; spikelets 3–5, nearly black, crowded, stem rough; rare. *C. distachya*, Willd.; spikelets 2–3, brown, stem slender, leafless; Salzburg, very rare. *C. castanea*, Miel.; spikelets stalked, chestnut-coloured, stem thick, flat, leafless; Salzburg, very rare.

(*b.*) Upper spikelets male; fruit not beaked or beak very short:—*C. ericetorum*, Poll. (*membranacea*, Hoppe); male spikelet 1, fruit finely hairy, leaves rather broad; rare. *C. brevifolia*, Host.; fruit ciliate (glabrous in the remainder), male spikelets 2, distant, stalked; moist; Tirol. *C. spadicea*, Host.; spikelets elongated, on long stalks, fruit elliptic, leaves channelled; Tirol (Monte Baldo). *C. irrigua*, Sm.; spikelets elliptic, on long stalks, fruit trigonous; moist; Tirol, Carniola. *C. pallescens*, L.; spikelets elliptic, on short stalks; bushy, frequent. *C. ornithopodioides*, Hausm.; spikelets small, capitate, involucral leaves composed only of a membranous sheath; Tirol, rare. *C. clavæforme*, Hoppe; involucral leaves with amplexicaul sheaths; Styria, Carniola, rare. *C. sparsiflora*, Steud. (*vaginata*, Tausch.); sheath of involucral leaves 1–2 in. long; rare. *C. ustulata*, Whlb.; sheath of involucral leaves not more than $\frac{1}{2}$ in. long; local.

(*c.*) Upper spikelets male; fruit with a long beak:—*C.*

subglobosa, Miel.; fruit nearly globose, inflated; Salzburg, rare. *C. tenuis*, Host.; stem slender, 6–12 in., fruit ribbed; frequent. *C. sylvatica*, Huds.; female spikelets pendant, on very long stalks, leaves broad; bushy. *C. frigida*, All.; spikelets shining, black-brown, the lowest very distant, on a long stalk; frequent. *C. firma*, Host.; stem 2–8 in., leaves short, rigid, linear-lanceolate; frequent. *C. capillaris*, L.; stem very slender, 3–8 in., somewhat exceeded by the erect linear leaves, lower female spikelets very distant, nodding; moist, frequent. *C. hispidula*, Gaud.; stem filiform, rough, angled, nearly leafless, anthers twisted; Switzerland, Tirol, very rare. *C. sempervirens*, Vill.; cæspitose, stem smooth, lowermost spikelet erect; dry, frequent. *C. ferruginea*, Scop.; root-stock stoloniferous, lowermost spikelet pendant; moist, frequent. *C. alpigena*, Kern. (*Kerneri*, Kohts); similar, but all the spikelets erect; Tirol, rare.

The following lowland British species also occur in Switzerland:—In marshes and bogs and by river-sides:—*C. pulicaris*, L.; *disticha*, Huds.; *vulpina*, L.; *paniculata*, L. (including *paradoxa*, Willd.); *teretiuscula*, Good.; *stricta*, Good.; *acuta*, Fr.; *Buxbaumii*, Whlb.; *Pseudocyperus*, L.; *flava*, L. (including *Œderi*, Ehrh., and *lepidocarpa*, Tausch.); *punctata*, Gaud.; *distans*, L. (including *Hornschuchiana*, Hoppe); *hirta*, L.; *limosa*, L.; *filiformis*, L.; *glauca*, Murr.; *tomentosa*, L.; *ampullacea*, Good.; *vesicaria*, L.; *paludosa*, Good.; *riparia*, Curt.; *panicea*, L. In woods and thickets:—*C. remota*, L.; *pendula*, Huds.; *depauperata*, Good.; *strigosa*, Huds.; *digitata*, L. (including *ornithopoda*, Willd.). On dry banks and hill-sides:—*C. humilis*, Leyss.; *montana*, L.; *pilulifera*, L.; *muricata*, L.; *præcox*, Jacq. (*verna*, Vill.).

Gremli also records the following lowland species (not British) as occurring in Switzerland:—*C. chordorhiza*, Ehrh.; resembling *incurva*, but stem much longer, branched; peat-bogs; Jura. *C. brizoides*, L.; resembling *disticha*, but spikelets yellowish, less numerous; woods. *C. cyperoides*, L.; head subtended by two foliaceous bracts, which greatly exceed it in length, fruit with a long beak; dried-up ponds, very rare. *C. Heleonastes*, Ehrh.; resembling *lagopina*, but stem rough, fruit compressed; peat-bogs. *C. pilosa*, Scop.; leaves broad, ciliate, exceeding the almost leafless stem, root-stock stoloniferous; woods, local. *C. nitida*, Host.; bracts sheathing, the upper one ending in a green point, female spikelets dense; dry slopes. *C. alba*, Scop.; female spikelets 1–3, erect, whitish; woods. *C. Halleriana*, Asso.; lowermost female spikelet springing from close to the root, on a very long stalk; rare; Neuchâtel, Aargau. *C. longifolia*, Host.; leaves longer than the stem, male spikelet thick, clavate; woods, rare.

Order CI.—GRAMINEÆ.

Stem jointed, usually cylindrical and with hollow internodes; leaves alternate, narrow; sheath split, often with a ligule at the point of junction with the blade; flowers usually bisexual; perianth replaced by brown or green scales (glumes and pales); stamens usually 3, with slender filament and versatile anther; ovary 1-celled, with 1 ovule; stigmas feathery; fruit a caryopsis, the seed adnate to the pericarp. The Grasses form a vast order, distributed through the entire globe, but there are comparatively few Alpine species.

Tribe 1. ORYZEÆ.—Spikelets compressed laterally; lower (barren) glumes minute or 0; uppermost glume and pale bearing a single flower. Not alpine.

1. LEERSIA, Sol.

Characters of the tribe.

L. oryzoides, Sw. (*Oryza clandestina*, Br.); paniele often undeveloped; in water, rare.

Tribe PANICEÆ.—Spikelets usually compressed dorsally; terminal glume only bearing a flower. Not alpine. Genera 2–4.

2. PANICUM, L.

Glumes 4; pedicel of spikelet naked or hairy.

P. glabrum, Gaud. (*Digitaria humifusa*, Pers.); spikelets about 3, digitate, leaves and sheaths glabrous; road-sides, occasional. *P. ciliare*, Koel.; leaves and sheaths hairy, empty glume ciliate; road-sides, local. *P. sanguinale*, Scop.; similar, but empty glume not ciliate; road-sides. *P. Crus-Galli*, L. (*Echinochloa Crus-Galli*, Beauv.); spikelets in racemes or panicles, glumes awned; road-sides, common. *P. undulatifolium*, Ard. (*Oplismenus undulatifolius*, Beauv.); leaves broad, stem and leaf-sheaths with long hairs; Ticino.

3. SETARIA, Beauv.

Glumes 4; pedicel of spikelet with stiff bristles.

S. viridis, Beauv.; bristles clustered, scabrid; road-sides. *S. verticillata*, Beauv.; bristles single or in pairs, barbed; road-sides, rare. *S. glauca*, Beauv.; spikelets

larger, bristles russet-yellow; road-sides. *S. ambigua*, Guss., is possibly a hybrid.

4. Tragus, Hall.

Spikelets of two flowers, the lower neuter, the upper bisexual.

T. racemosus, Desf.; spikelets in a linear racemose panicle, with small hooked bristles, leaves ciliate; sandy places; Valais.

Tribe 3. Phalarideæ.—Spikelets compressed laterally; glumes usually 6, uppermost only fertile; pale 0 or 1-nerved. Not alpine. Genera 5–8.

5. Phalaris, L.

Glumes 6, two of them imperfect, not awned; stamens 3.

P. arundinacea, L.; panicle elongated, spreading and red when in flower; ditches.

6. Anthoxanthum, L.

Glumes 6, two of them imperfect, awned; stamens 2.

A. odoratum, L., Sweet Vernal Grass; everywhere.

7. Hierochloe, Gmel.

Glumes 6; upper flower bisexual with 2, two lower flowers male with 3 stamens.

H. borealis, R. and S.; flowering glumes shortly awned; water-sides, very rare; Zürich, Einsiedeln.

8. ALOPECURUS, L.

Glumes 3 or 4; spikelets jointed on the pedicel.

A. agrestis, L., Fox-tail Grass; in meadows. *A. pratensis*, L.; with more cylindrical panicle; wet fields. *A. geniculatus*, L.; lower part of stem prostrate, rooting; in water. *A. fulvus*, Sm.; resembling the last, with yellow anthers; ditches.

Tribe ANDROPOGONEÆ.—Spikelets in pairs, one sessile, the other stalked, with a single bisexual or male flower. Not alpine.

9. ANDROPOGON, L.

Glumes 2, equal or nearly so.

A. Ischænum, L.; spikelets 5–10, fascicled-digitate, hairy; stony places. *A. Gryllus*, L. (*Pollinia Gryllus*, Spreng.); spikelets with a crown of reddish-yellow hairs at the base; Vaud, Valais, Ticino, Pyrenees. *A. Allionii*, DC. (*Heteropogon Allionii*, R. S.); glumes with long twisted awns; rocky places; Ticino.

Tribe AGROSTIDEÆ.—Spikelets terete or compressed laterally; glumes 3; flower solitary, bisexual; pale 2-nerved. Genera 10–17.

10. MILIUM, L.

Panicle spreading; flowering glume hardening round the fruit. Not alpine.

M. effusum, L., Millet Grass; leaves broad, flat, ultimate branches of panicle very slender; woods, common.

11. Phleum, L.

Panicle dense, cylindrical; flowering glume enclosing the fruit; empty glumes often truncate.

P. pratense, L., Timothy Grass; very common. *P. alpinum*, L. (including *commutatum*, Gaud.); panicle ovoid, upper leaf-sheath inflated; alpine pastures, frequent. *P. Michelii*, All.; glumes lanceolate, glabrous, with long stiff hairs on the keel; alpine pastures. *P. asperum*, Jacq.; glumes wedge-shaped, the keel rough-tubercular; waste ground, rare. *P. Bœhmeri*, Wib.; glumes linear-oblong, spotted-tubercular; waste ground.

12. Mibora, Adans.

Spikelets compressed dorsally, in a simple sub-distichous spike; styles very long. Not alpine.

M. minima, Desv. (*Knappia agrostidea*, Sm.); densely cæspitose, stems very slender, 1–3 in.; wet sandy places, rare.

13. Agrostis, L.

Panicle loose, with whorled branches; spikelets 1-flowered; flowering glume small, hyaline.

A. vulgaris, With., Bent Grass; everywhere. *A. canina*, L.; leaves narrower; wet places. *A. alba*, L.; ligule long, acute; common. *A. rupestris*, All.; branches of panicle glabrous, spikelets small; rocky; alpine, frequent. *A. alpina*, Scop.; spikelets smaller, panicle oval, branches rough; rocky; alpine, common. *A. Schleicheri*, Jord.; a larger plant, panicle lanceolate in outline, branches rough; Switzerland, Jura, rare. *A. Spica-Venti*, L. (*Apera*

Spica-Venti, Beauv); flowering glume with a long awn, panicle large (3 in.), spreading; cultivated land. *A. interrupta*, L., similar, but panicle narrow, interrupted; cultivated land.

14. CALAMAGROSTIS, Adans.

Rachis of spikelet with long silky hairs; spikelets in a close panicle with whorled branches, 1-flowered; stem tall, leafy.

A. Flowering glumes hyaline:—*C. Epigejos*, Roth; panicle open, awn of flowering glume inserted above the middle; wet places. *C. lanceolata*, Roth; panicle open, awn terminal; swamps. *C. tenella*, Host.; stem 18–24 in., slender, hairs of rachis few; dry; alpine. *C. Halleriana*, DC.; stem 2–3½ ft., rachis very hairy; alpine meadows. *C. litorea*, DC.; panicle rather drooping, stem usually very rough; river-banks, local.

B. Flowering glumes not hyaline, or only at the edge, awn of flowering glume twisted (*Deyeuxia*, Clar.):—*C. varia*, Lk. (*montana*, DC.); awn bent, hairs of rachis very long; bushy; alpine. *C. arundinacea*, Roth (*sylvatica*, DC.); hairs of rachis not so long, awn bent; bushy; alpine. *C. neglecta*, Fr.; awn straight; peat-bogs, very rare; Pontarlier, Constance.

15. LASIAGROSTIS, Lk.

Resembling *Calamagrostis*, but only the empty glumes enveloped in long silky hairs.

L. Calamagrostis, Lk.; panicle spreading, white, shining, awn of empty glume very long; rocky; alpine.

16. Gastridium, Beauv.

Empty glumes large, boat-shaped, flowering glume minute, 4-toothed. Not alpine; annual.

G. lendigerum, Gaud.; panicle glistening, spikelets with a long awn; sandy places, rare; Geneva, Como, Pyrenees.

17. Stipa, L.

Spikelet composed of one stalked bisexual flower; flowering glume with a twisted awn.

S. pennata, L.; awn 8–12 in. long, plumose; high, rocky. *S. capillata*, L.; awn half as long, rough, not plumose; high, rocky; Southern Switzerland, Jura, Dauphiny, Pyrenees.

Tribe Aveneæ.—Spikelets in panicles, 2-, rarely 3- or 4-flowered; glumes 4 or more, the two lowest empty; flowering glumes with twisted awns. Genera 18–22.

18. Aira, L.

Spikelets 2-flowered; flowers all perfect, or the upper ones imperfect.

A. Rachis of spikelet not produced beyond the uppermost flowering glume:—*A. præcox*, L.; panicle compressed, spike-like; sandy places; Valais, Piedmont, Pyrenees. *A. caryophyllea*, L.; panicle spreading, stem very slender; sandy places. *A. multiculmis*, Dum.; similar, but spikelets smaller, more crowded.

B. Rachis not produced; awn nearly straight (*Deschampsia*, Beauv.):—*A. cæspitosa*, L.; panicle pyramidal; moist, frequent. *A. flexuosa*, L.; panicle very lax,

branches wavy, awn slightly bent, leaves filiform; woodsides, frequent. *A. rhenana*, Grml.; similar, but spikelets much larger, panicle narrower; Schaffhausen.

C. Rachis not produced; awn bent in the middle, with swollen tip (*Corynephorus*, Beauv.):—*A. canescens*, L.; cæspitose, leaves short, rigid; sandy places, rare; Schaffhausen, Geneva, Dauphiny, Lombardy, Pyrenees.

19. Holcus, L.

Spikelets 2-flowered; lower flower not awned, upper imperfect and awned; stem and leaves very soft. Not alpine.

Our two English species; *H. lanatus*, L., tomentose, awn short; and *mollis*, L., villous at the nodes, awn very long; are common meadow-grasses.

20. Trisetum, Pers.

Spikelets 2–6-flowered; glume deeply bifid, awned.

T. flavescens, Beauv.; panicle loose, spikelets often violet; meadows, common. *T. distichophyllum*, Beauv.; panicle loose, stem 4–6 in., leaves stiff, flat; stony, alpine. *T. argenteum*, Sch.; panicle loose, stem up to 4 in., leaves setaceous, channelled; stony, alpine; Grimsel, Ticino, Lombardy, Tirol, Styria, Carinthia, Salzburg. *T. subspicatum*, Beauv.; panicle spike-like, stem hairy above, spikelets yellowish-green; high, alpine. *T. Gaudinianum*, Boiss.; panicle spike-like, stem hairy above, spikelets variegated with violet; sandy places; Valais.

21. Avena, L.

Spikelets 2–6-flowered; flowering glume entire or bidentate, with a long twisted awn.

A. Spikelets at length drooping; annual plants:—*A. fatua*, L., Wild Oat; common. *A. strigosa*, Schreb.; very similar, but smaller and more slender; cornfields. *A. nuda*, L.; spikelets generally 3-flowered; cornfields, rare.

B. Perennial; leaves and lower leaf-sheaths downy or woolly:—*A. alpestris*, Host.; spikelets 3-flowered, 3–6 in each branch of the panicle; Tirol, Styria. *A. pubescens*, L.; spikelets 1–2 in each branch, leaves pubescent; pastures. *A. amethystina*, Clar.; similar, leaves and leaf-sheaths woolly; Southern Tirol, rare (Monte Baldo).

C. Perennial; leaves rough:—*A. pratensis*, L.; panicle nearly linear, leaves very rough; hill-sides. *A. planiculmis*, Schrad.; leaf-sheaths flat, 2-edged; pastures; Styria, Carinthia. *A. Scheuchzeri*, All.; leaves smooth on the upper side, spikelets 5-flowered, variegated; alpine pastures. *A. pseudoviolacea*, Kern.; similar, but spikelets 3-flowered, panicle looser; Tirol, rare. *A. Parlatorii*, Woods; panicle spreading, leaves stiff; high, dry (not in Switzerland). *A. alpina*, Sm.; panicle racemose, leaves very rough; dry; Tirol, Carniola. *A. lucida*, Bert.; panicle simple, leaves very narrow; Southern Tirol, rare. *A. montana*, Vill.; spikelets shining, violet; Piedmont, Dauphiny, Pyrenees.

22. Arrhenatherum, Beauv.

Spikelets 2-flowered; upper flower bisexual, lower male. Not alpine.

A. avenaceum, Beauv. (*elatius*, M. K.), False Oat; everywhere.

Tribe CHLORIDEÆ.—Spikelets in one or two rows on a flattened rachis, compressed laterally, 1- or more-flowered.

23. CYNODON, Rich.

Characters of the tribe. Not alpine.

C. Dactylon, Pers., Dog's-tooth Grass; spikes digitate, purplish, spikelets 1-flowered; sandy places.

Tribe FESTUCEÆ.—Spikelets in spikes or panicles; glumes 6 or more, two lowest empty, the others flowering. Genera 24–38.

24. DANTHONIA, DC.

Spikelets 2- or more-flowered, in panicles; empty glume with a long awn.

D. decumbens, DC. (*Triodia decumbens*, Beauv.); stems prostrate, rigid, cæspitose, panicle 1–2 in., leaves and leaf-sheaths hairy; alpine pastures. *D. provincialis*, DC. (*calycina*, Vill.); stem erect, up to 18 in., leaf-sheaths bearded, awn twisted at the base; alpine pastures in the South, rare.

25. PHRAGMITES, Trin.

Spikelets 2- or more-flowered; rachis bearded with long silky hairs. Not alpine.

P. communis, Trin. (*Arundo Phragmites*, L.), Reed; panicle very large and soft, dull purple, leaves 1½–2 in. broad, stem up to 8 ft.; in water, common.

26. SESLERIA, Scop.

Spikelets capitate or in spikes, with empty soft glumes beneath them. Alpine.

S. cærulea, Scop.; panicle cylindrical, blue, leaves flat, linear; rocky woods, frequent. *S. tenuifolia*, Host.; panicle elliptic-cylindrical, leaves setaceous, lower ones webbed; Southern Carniola, rare. *S. sphærocephala*, Ard. (Pl. 119); panicle globose, white, leaves narrowly linear, flowering glume shortly awned; high; Ticino, Tirol, Lombardy, Carniola, Carinthia, Styria. *S. ovata*, Kern.; panicle ovate, dark blue, flowering glumes ending in five awns; high; Tirol, Lombardy, Carinthia, Styria, Salzburg. *S. disticha*, Pers.; raceme simple, unilateral, spikelets in two rows; very high, frequent. *S. pedemontana*, Reut.; spike small, oval, leaves soft; Dauphiny.

27. Cynosurus, L.

Resembling *Sesleria;* but empty glumes setaceous. Not alpine.

C. cristatus, L., Dog's-tail Grass; spike linear, awns very short; pastures. *C. echinatus*, L.; panicle dense, awns long; fields; Valais, Ticino, Pyrenees.

28. Kœleria, Pers.

Spikelets forming a cylindrical spike, 2- or more-flowered; flowering glumes scarious. Alpine.

K. hirsuta, Gaud.; empty glumes awned, stem tomentose; high; Switzerland (rare), Tirol, Carinthia, Lombardy, Salzburg. *K. eriostachya*, Pan. (*carniolica*, Kern.); empty glumes not awned, stem covered with a grey felt; Southern Tirol, Carinthia, Carniola. *K. valesiaca*, Gaud. (*setacea*, DC.); empty glumes not awned, radical leaves setaceous, rolled up; Valais, Neuchâtel, Aigle, Savoy, Ticino, Piedmont, Pyrenees. *K. cristata*, L.; empty

SESLERIA SPHÆROCEPHALA

glumes not awned, glabrous, leaves blue-green, panicle violet; alpine pastures. *K. splendens*, Presl. (including *pubescens*, Hausm.); similar, but empty glumes covered with dense wool; Tirol, Carinthia. *K. alpicola*, G. and G.; empty glumes awned, spikelets 2-flowered, ashy-white; Piedmont, Dauphiny.

29. MOLINIA, Schr.

Spikelets in a contracted panicle, 2- or more-flowered, conical, terete.

M. cærulea, Mœnch.; stem wiry, nearly leafless, spikelets dark violet; moist, sub-alpine, common. *M. serotina*, M. K. (*Diplachne serotina*, Lk.); stem leafy, spikelets shortly awned; slopes; Valais, Vaud, Ticino.

30. CATABROSA, Beauv.

Spikelets in a diffuse panicle with whorled branches, 2- or more-flowered. Not alpine.

C. aquatica, Beauv.; panicle large, pyramidal, stem 6–12 in., bent below, leaves flat; in water.

31. MELICA, L.

Spikelets 2- or more-flowered; upper flowering glumes empty, convolute, forming a club.

M. nutans, L.; spikelets drooping, with two fertile flowers; woods, common. *M. uniflora*, Retz.; spikelets very few, erect, on long stalks, with only one fertile flower; mountain woods, frequent. *M. ciliata*, L.; panicle dense, continuous; rocky hills; Southern Switzerland, Jura, rare. *M. glauca*, Schultz (*nebrodensis*,

Parl.; panicle loose, leaves setaceous, rolled-up; rocky hills.

32. Dactylis, L.

Spikelets few-flowered; lowest branch of panicle distant, on a long horizontal stalk. Not alpine.

D. glomerata, L., Cock's-Foot Grass; everywhere.

33. Briza, L.

Spikelets many-flowered, distant, pendulous, on very slender stalks. Not alpine.

B. media, L., Quaking Grass; common.

34. Poa, L.

Spikelets in panicles, few- or many-flowered; flowering glumes compressed, keeled; pale bifid.

A. Stem thickened at the base like a bulb:—*P. alpina*, L.; ligules truncate, spikelets often replaced by leafy buds (viviparous); alpine pastures, common. *A. bulbosa*, L.; spikelets pubescent, ligules oblong, acute; waste places. *P. concinna*, Gaud.; cæspitose, leaves rolled up, panicle dense; Valais, Piedmont, very rare (Sion, Aosta).

B. Stem and leaf-sheaths compressed:—*P. compressa*, L.; root-stock with elongated stolons; dry banks and walls, common. *P. sudetica*, Hænk.; leaves suddenly acuminate and cap-shaped at the apex; alpine pastures, frequent. *P. hybrida*, Gaud.; flowers woolly at the base, leaves gradually narrowed; alpine pastures, local.

C. Stem and leaf-sheaths nearly cylindrical; root-stock with elongated stolons:—*P. pratensis*, L.; meadows, very common. *P. distichophylla*, Gaud.; spikelets dark violet;

alpine pastures, frequent. *P. cenisia*, All. (*pallens*, Gaud.); panicle spreading, spikelets greenish-yellow; alpine pastures, frequent.

D. Similar; but stolons short or 0; branches of panicle smooth:—*P. annua*, L.; Meadow Grass; everywhere. *P. minor*, Gaud.; branches of panicle capillary, stem 2–6 in.; alpine pastures, frequent. *P. laxa*, Hænk.; spikelets few-flowered, stem 3–6 in.; alpine pastures, frequent. *P. pumila*, Host.; panicle erect, leaves setaceous, convolute; Carinthia, Carniola, very rare. *P. supina*, Schrad., appears to be a mountain form of *annua*.

E. Similar; but branches of panicle rough:—*P. trivialis*, L.; meadows, common. *P. palustris*, L. (*serotina*, Ehrh.); leaf-sheaths smooth; damp meadows. *P. nemoralis*, L.; woods, common. *P. cæsia*, Sm.; plant bluish-green, ligules covering the nodes; alpine rocks, local.

35. Glyceria, A. Br.

Spikelets many-flowered; flowering glumes convex, obtuse, not awned. Aquatic grasses.

The English species; *G. aquatica*, Sm., with greatly branched panicles; *fluitans*, Br. (including *plicata*, Fr.), with nearly simple panicle; and *distans*, Whlb., with very long and slender panicle; all in wet places, the last local.

36. Festuca, L.

Spikelets 3- or more-flowered, in spikes or panicles; flowering glumes convex, acute, or awned at the tip; ovary usually glabrous.

The following British species of Fescue Grass occur also in the lowlands of Switzerland:—*F. pratensis*, Huds.,

in meadows; *elatior*, L. (*arundinacea*, Schreb.), by water; *gigantea*, Vill., in damp woods; *ovina*, L. (including *duriuscula*, L., *rubra*, L., and *valesiaca*, Schl.), in hilly woods and sub-alpine pastures; *sylvatica*, Vill., in woods. Also the following annual species:—*F. Myuros*, L. (*Vulpia Myuros*, Rchb., including *ciliata*, Lk., *pseudo-myuros*, Koch, and *sciuroides*, Roth); flowering glumes with slender awns, stamens 1–3; sandy places; and *F. rigida*, Kunth (*Sclerochloa rigida*, Lk.), a small, very rigid plant; walls and dry places.

The following are more or less alpine:—

A. Stem thickened and bulb-like at the base:—*F. spadicea*, L.; spikes brownish-yellow; high alpine pastures in the South.

B. Leaves more or less folded; ligule lobed at the base; cæspitose:—*F. amethystina*, L.; panicle lax, often blue, leaves filiform; rare; Switzerland, Tirol, Salzburg. *F. alpina*, Sut.; stem 3–5 in., flowers often replaced by buds; high; Switzerland, Dauphiny. *F. Halleri*, Vill. (*Gaudini*, Kunth); panicle small, denser, often violet; high elevations in the South, also Bâle, Jura.

C. Stem-leaves flat; ligule lobed at the base; cæspitose:—*F. heterophylla*, Lam. (including *nigrescens*, Lam.); leaves very long, panicle loose, drooping; wood-sides. *P. violacea*, Gaud.; panicle spike-like, dark violet, leaves capillary; high, frequent.

D. Leaves setaceous; ligule not lobed:—*F. pilosa*, Hall.; spikelets bearded, 3–5-flowered; pastures, local. *F. Brenneri*, F. and H.; spikelets bearded, 6–8-flowered; Tirol, rare. *F. flavescens*, Bell; panicle spike-like, nodding, spikelets 3–5-flowered, glume not awned; Carinthia, Carniola, Dauphiny. *F. pumila*, Chaix; panicle race-

mose, glume awned; high, frequent. *F. varia*, Host. (including *Eskia*, Ram.); leaves long, thick, rigid, panicle expanded, spikelets larger, 4–8-flowered; high elevations in the South.

E. Stem-leaves flat; ligules not lobed:—*F. laxa*, Host.; panicle large, lax, lowermost leaves folded, ovary hairy at the apex; Carniola, Carinthia, rare. *F. Scheuchzeri*, Gaud. (*pulchella*, Schrad.); panicle lax, leaves linear, smooth, ovary glabrous at the apex; high, frequent. *F. spectabilis*, Jan.; panicle broad, nodding, leaves linear, rough, ovary hairy at the apex; alpine pastures in the South, rare.

37. BROMUS, L.

Spikelets in panicles, many-flowered; flowering glumes convex; ovary villous at the apex. Not alpine.

The Swiss species which are also English fall under two groups, viz.:—(*a.*) Lower empty glume 1-nerved, upper 3-nerved (*Festucoides*, C. and D.):—*B. asper*, Murr. (including *serotinus*, Ben., and *ramosus*, Huds.); *erectus*, Huds.; and *sterilis*, L. (*b.*) Lower empty glume 3–5-nerved, upper 5-many-nerved (*Serrafalcus*, Parl.):—*B. mollis*, L.; *racemosus*, L. (including *commutatus*, Schrad.); *secalinus*, L. (including *velutinus*, Schrad.); and *arvensis*, L.

The following are not British:—Sect. (*a.*):—*B. inermis*, Leyss.; lowest empty glume not awned; very rare; Bâle, Orbe. *B. tectorum*, L.; panicle dense, drooping on one side, branches smooth; road-sides. Sect. (*b.*):—*B. patulus*, M. K.; and *squarrosus*, L.; panicle much branched; waste places, frequently introduced. Also *B. transylvanicus*, Steud.; panicle loose, lowest branches very long, leaves ciliate; meadows; Tirol, Carniola.

38. Brachypodium, Beauv.

Resembling *Bromus;* but spikelets in spikes or simple racemes. Not alpine.

The two English species; *B. pinnatum*, Beauv., leaves narrow, spike erect, awn short; and *B. sylvaticum*, R. and S., leaves broad, hairy, spike drooping, awn longer; both in woods.

Tribe Hordeæ.—Spikelets 1- or more-flowered, sessile in the notches of a simple rachis. Genera 39–44.

39. Lolium, L.

Spikelets solitary, many-flowered, with their sides to the rachis. Not alpine.

Our common English species, *L. temulentum*, L., Darnel; and *perenne*, L. Also *L. multiflorum*, Gaud.; spikelets composed of 10–25 flowers; fields. *L. rigidum*, Gaud.; stem branched at the base, flowers not awned; hills, rare; Sion. *L. linicolum*, A. Br.; stem slender, flowers not awned; among flax. *L. speciosum*, Bieb.; flowers with long wavy awns; among corn.

40. Agropyrum, Gaertn. (*Triticum*, Huds.).

Spikelets solitary, many-flowered, with their faces to the rachis. Not alpine.

Our common English species; *A. caninum*, Beauv., and *repens*, Beauv., Couch-Grass, Twitch-Grass. Also *A. glaucum*, Desf. (*intermedium*, Host.); glumes very obtuse or truncate; hills; Vaud, Valais.

41. NARDURUS, Rchb.

Resembling *Agropyrum;* but spikelets stalked. Not alpine.

N. unilateralis, Boiss. (*tenellus*, Rchb., *Festuca tenuiflora*, Koch); spike unilateral, flowers generally with a long awn; dry places, rare; Geneva, Valais, Salève, Dauphiny. *N. Lachenalii*, Godr.; spike distichous, flower usually not awned; dry places; Ticino, Aargau.

42. HORDEUM, L.

Spikelets 2–3 in each cluster, 1-flowered. Not alpine.

The English species *H. murinum*, L., Wild Barley, very common by road-sides; *pratense*, Huds. (*secalinum*, Schreb.), meadows, rare; and *sylvaticum*, Huds. (*Elymus europæus*, L.), mountain woods.

43. GAUDINIA, Beauv.

Resembling *Agropyrum;* but fruit contracted at the apex, and ending in a small ciliated cup. Not alpine.

G. fragilis, Beauv.; spike long, slender, rachis geniculate, stem branching from the base; road-sides; Vaud, Valais, Geneva, Jura.

44. NARDUS, L.

Spikelet solitary, secund, 1-flowered; empty glumes 0.

N. stricta, L., Mat Grass; densely cæspitose, leaves setaceous, rigid, spikelets awned; mountain pastures.

Sub-Kingdom II.—GYMNOSPERMS.

Seeds naked, not enclosed in an ovary. (Orders CII.–CIII.)

Order CII.—CONIFERÆ.

Flowers unisexual, monœcious or diœcious; perianth 0; male flowers in false catkins, composed of one or more anthers; female flowers solitary or arranged, usually in pairs, on the under side of open carpellary leaves, which harden into woody scales, forming a cone; seeds often winged; leaves usually rigid, subulate, often in fascicles. Trees or shrubs, usually evergreen, and mostly resinous. A rather large order, most abundant in the colder parts of the Northern Hemisphere.

1. Juniperus, L.

Male catkins small; female cones ripening the second year, few-flowered, small, globose, berry-like, resinous, composed of fleshy scales, blue when ripe; ovules 1–2 under each scale; leaves subulate or scale-like, resinous.

J. communis, L., Juniper; open hill-sides; Switzerland, Pyrenees. *J. nana*, Willd. (*alpina*, Clus.) (Pl. 120); leaves linear, shorter and broader than in the last, in whorls of 3, stem prostrate or ascending; open hill-sides, high; Switzerland, Jura, Tirol, Carpathians, Dauphiny, Pyrenees. *J. Sabina*, L., Savin; cone on a short recurved stalk, leaves of two kinds, small rhomboidal scales, imbricate in four rows, and acicular, spreading; high; Switzerland, Tirol, Carniola, Styria, Dauphiny, Pyrenees.

CXX.—JUNIPERUS NANA.

2. Taxus, L.

Male catkins few-flowered; carpellary leaves peltate; female flowers of a few minute scales and one terminal ovule, ultimately seated in a red fleshy cup; leaves linear, resinous.

T. baccata, L., Yew; woods, frequent.

3. Pinus, L.

Male catkins many-flowered; cone usually ripening the second year, composed of many female flowers, each consisting of a woody carpellary leaf, bearing two seeds on its under side; leaves acicular, in fascicles. Resinous usually evergreen trees.

P. sylvestris, L., Scotch Fir; cone stalked, recurved when young, seeds winged, leaves 2 in a sheath; mountain woods, common. *P. uncinata*, Ram.; cone oblique at the base, seeds winged, leaves two in a sheath; mountain woods; Switzerland, Dauphiny, Pyrenees. *P. Mughus*, Scop. (*montana*, Mill.); stem partially prostrate, cone straight, longer than the leaves, scales with a depressed point in the middle, seeds winged; common at a high elevation. *P. Pumilio*, Hænk.; resembling the last, but more prostrate, cone shorter than the leaves, scales with a depressed point below the middle; less common; Switzerland, Jura, Bavaria, Styria, Dauphiny. *P. Laricio*, Poir. (*nigricans*, Host., *pyrenaica*, Lap.); leaves in pairs, glaucous, very long; Carniola, Pyrenees. *P. Cembra*, L.; leaves 3–5 in a sheath, very long; seeds not winged, very large, edible; very local; Grisons, Valais, Tirol, Salzburg, Dauphiny. *P. Larix*, L. (*Abies Larix*, Lam., *Larix europæa*, DC.), Larch; leaves in clusters of 15–20,

deciduous; mountain woods; Southern Switzerland, Lombardy, Bavaria, Dauphiny.

4. Abies, DC.

Resembling *Pinus;* but the leaves solitary; always evergreen.

A. excelsa, Poir. (*Pinus Abies*, L.), Spruce Fir; leaves numerous, somewhat 4-edged, cone cylindrical, pendant, scales denticulate; mountain woods, frequent. *A. pectinata*, DC. (*Pinus Picea*, L.), Silver Fir; leaves pectinate, silvery-white beneath, cones erect, with blunt adpressed scales; mountain woods, frequent.

Order CIII.—GNETACEÆ.

Flowers unisexual, monœcious or diœcious; male flowers with a tubular membranous perianth; otherwise resembling *Coniferæ*. A very small order, chiefly of Tropical plants; no alpine species.

1. Ephedra, L.

Diœcious; stems slender, jointed; leaves very small, scale-like, in whorls at the joints.

E. helvetica, Mey. (*distachya*, L., *vulgaris*, Rich.); stem 1–2 feet, female catkins appearing, when ripe, like red berries; rocky places; Valais, Dauphiny, very local, but often abundant (Sion).

GLOSSARY

Accumbent (of the radicle)—Folded against the edge of the cotyledons (*Cruciferæ*).

Achene—A dry indehiscent fruit, containing only a single seed (*Ranunculus*, *Compositæ*).

Amplexicaul (of leaves)—Embracing the stem.

Anemophilous (of flowers)—Pollinated by the agency of the wind.

Anther—The pollen-sac of the stamen.

Aril—An outgrowth from the coat of a seed (*Euonymus*).

Auricled (of leaves)—With a large lobe at the base.

Axile (of ovules)—Attached to the axis of the ovary (*Epilobium*, *Iris*).

Axillary—In the axil of a leaf or in the angle made by the upper side of the leaf-stalk with the branch.

Basifixed (of the anther)—Fixed to the filament by its base.

Bisexual (of flowers)—Having both pistil and stamens in the same flower.

Bract—A small leaf at the base of a flower or flower-stalk.

Cæspitose (of stems or leaves)—Very crowded.

Capitule—A dense head of small flowers seated on a flat or conical receptacle (*Compositæ*).

Capsule—A dry dehiscent fruit (*Caryophylleæ*, *Iris*).

Carpel—The portion of the female organ which corresponds structurally to a leaf.

Caryopsis—An achene in which the seed is adherent to the wall of the ovary (*Grasses*).

Ciliate—Furnished with fine hairs at the margin.

Cladode—A flat leaf-like branch (*Ruscus*).

Claw (of petals)—The narrow stalk-like part (*Dianthus*, *Stellaria*).

Connate—Adhering by the edges.

Connective—The membrane which unites the two lobes of the anther.

Cordate (of leaves)—Heart-shaped.

Corm—A short thick rhizome, resembling a bulb in form (*Crocus*).

Corymb—Any flat-headed inflorescence (*Elder*).

Cotyledons—The first leaves of a plant formed within the seed.

Cremocarp—A seed-vessel consisting of two achenes (*Umbelliferæ*).

Crenate (of leaves)—With rounded teeth (*Violet*).

Cross-pollination—Pollination of the stigma by pollen brought from another flower of the same kind.

Crown or *Corona*—An outgrowth from the mouth of the corolla (*Silene*, *Narcissus*).

Cupule—A cup in which a flower or group of flowers is seated (*Acorn*).

Cyme—An inflorescence in which the upper or inner flowers open before the lower or outer ones (*Sedum*, *Sambucus*).

Decurrent (of leaves)—Running down the stem.

Decussate (of leaves)—Growing in opposite pairs, each pair at right angles to the pair above and below it (*Labiatæ*).

Dehiscent (of seed-vessels)—Bursting to allow of the escape of the seeds (*cf.* Capsule, Legume).

Dentate (of leaves)—With sharp teeth pointing outwards (*Holly*).

Diadelphous (of stamens)—Where there are ten stamens, nine of the filaments being partially coherent, the tenth distinct (*Leguminosæ*).

Didynamous (of stamens)—Two long and two short (*Labiatæ*).

Digitate (of leaves)—Composed of several leaflets all springing from the same point (*Horse-Chestnut*).

Dimorphic (of flowers)—Of two different kinds.

Dioecious—Having male and female flowers on different individuals (*Willow*).

Disk—The part of the flower intermediate between the pistil and the stamens.

Dorsifixed (of the anther)—Fixed to the filament by its back.

Drupe—A stone-fruit.

Ensiform (of leaves)—Sword-shaped.
Entire (of leaves)—When the margin is not notched (*Privet*, *Periwinkle*).
Entomophilous (of flowers)—Pollinated by the agency of insects.
Epicalyx—A whorl of small leaves outside the true calyx (*Malva*).
Epigynous (of stamens)—Springing from above the ovary.
Epipetalous (of stamens)—Attached to the corolla.

Female (of a flower)—Having a pistil but no stamens.
Filament—The stalk of a stamen.
Follicle—A dehiscent seed-vessel bursting down the front only (*Aquilegia*, *Saxifraga*).
Free central (of placentæ)—When the ovules are attached to an elevation in the centre of the ovary (*Primula*).
Fruit—The seed-vessel with its seeds.
Funicle—The stalk of an ovule.

Glabrous—Without hairs.
Glaucous (of leaves)—Smooth and shining.
Glume (in sedges and grasses)—A membranous leaf at the base of a simple inflorescence or of each branch of a compound inflorescence.

Haustorium—The special organ by which a parasite obtains its nutriment from its host (*Dodder*, *Mistletoe*).
Heterostylous—Having styles of unequal lengths in different individuals (*Oxalis*, *Primula*).
Hypogynous (of stamens)—Springing from beneath the ovary.

Incumbent (of the radicle)—Folded against the back of one of the cotyledons (*Cruciferæ*).
Indehiscent (of seed-vessels)—Not bursting to allow of the escape of the seeds (*cf.* Achene, Drupe).
Inferior (of calyx)—Below the ovary ; (of ovary)—apparently below the calyx.
Inflorescence—A group of flowers.
Internode (of stems)—The space between two nodes.

Involucre—A whorl of bracts beneath a flower or an inflorescence.
Irregular (of a flower)—Where the petals are not all alike.

Labellum (in Orchideæ)—One of the petals which is usually much larger than the others.
Latex—A milky juice formed in special receptacles (*Papaver*, *Sonchus*, *Euphorbia*).
Legume—A dehiscent seed-vessel splitting down both back and front (*Leguminosæ*).
Ligule (in grasses)—A small appendage to the leaf at the point where it springs from the stem.
Loculus—A division or chamber of the ovary.

Male (of flowers)—Having stamens but no pistil.
Mericarp—Each half of a cremocarp (*Umbelliferæ*).
Monadelphous (of stamens)—The filaments all more or less coherent (*Leguminosæ*).
Monœcious—Having male and female flowers on the same individual (*Hazel*).
Mucronate (of leaves)—When the mid-rib projects beyond the leaf like a tooth.

Nectary—Any organ that secretes nectar.
Node (of stems)—The zone from which one or more leaves spring.
Nutlet—A small dry indehiscent fruit (*Borragineæ*).

Ochrea—A stipule-like structure forming a sheath round the stem (*Polygonaceæ*).
Ovary—The lower part of the pistil containing the ovules.
Ovule—A rudimentary seed.

Pale (in grasses)—An inner bract, from the axil of which springs a flower.
Panicle—A branched raceme (*Gramineæ*).
Pappus—The crest of silky hairs into which the calyx is sometimes transformed (*Compositæ*).
Parasite—A plant which obtains its sustenance from the living tissues of another plant (*Dodder*, *Mistletoe*).

Parietal (of ovules)—Attached to the wall of the ovary (*Viola*).

Pedicel—A flower-stalk.

Peltate (of leaves)—Nearly round, with the petiole in the centre (*Hydrocotyle*).

Penicillate—Having the form of a pencil of hairs.

Perianth—The calyx and corolla together or calyx alone (used chiefly in describing Endogens).

Pericarp—The wall of the ovary.

Perigyne (in *Cyperaceæ*)—The same as utricle.

Perigynous (of stamens)—Attached to the calyx.

Petiole—A leaf-stalk.

Pinnate (of leaves)—Composed of numerous leaflets arranged in pairs on an axis (*Vetch*, *Elder*).

Pinnatifid (of leaves)—Partially divided in a pinnate manner.

Placenta—The part of the wall of the ovary to which the ovules are attached.

Placentation—The mode of attachment of the ovules to the ovary.

Pollination—The falling of the pollen on the stigma.

Pollinium—The contents of an anther-lobe where the pollen-grains are attached together in a solid mass (*Asclepiadeæ*, *Orchideæ*).

Proterandrous—When the stamens are mature before the stigma in the same flower (*Labiatæ*).

Proterogynous—When the stigma is mature before the stamens in the same flower.

Pseudocarp—An apparent fruit formed of some other part of the flower in addition to the mature ovary (*Strawberry*, *Apple*).

Pyxis—A capsule splitting horizontally (*Hyoscyamus*, *Anagallis*).

Raceme—An inflorescence composed of stalked flowers arranged on an axis, and opening in succession from below upwards (*Bluebell*, *Laburnum*).

Rachis—The axis of an inflorescence or of a pinnate leaf.

Radicle—The part of the embryo which develops into the root.

Receptacle—The apex of the flower-stalk from which the flowers spring.

Regular (of flowers)—When the petals are all alike.

Rhizome—A fleshy horizontal underground stem putting up stems from its upper surface (*Solomon's-Seal*).

Root-stock—An underground stem.

Rostellum (in Orchideæ)—A projecting lobe of the stigma beneath the anther.

Rotate (of the corolla)—When the lobes are spread out flat (*Primrose*, *Forget-me-not*).

Runcinate (of leaves)—With large coarse lobes near the base.

Samara—A winged indehiscent seed-vessel (*Sycamore*, *Elm*).

Scabrid—Rough and tubercled.

Scape—The stalk of an inflorescence (usually leafless).

Scarious—Dry and shrivelled.

Septum—A division wall within an ovary.

Sessile (of leaves or anthers)—Without a stalk.

Setaceous (of leaves)—Very stiff and narrow ; bristle-like.

Silicula—A short broad siliqua (*Shepherd's-Purse*).

Siliqua—An elongated bilocular capsule, with the ovules attached to the margin of the septum (*Cruciferæ*).

Spadix—A fleshy spike of unisexual flowers (*Arum*).

Spathe—A large bract enveloping an inflorescence (*Arum*, *Allium*).

Spike—An inflorescence composed of sessile flowers arranged on an axis (*Plantago*, *Wheat*).

Staminode—An imperfect stamen (*Borragineæ*).

Stigma—The portion of the pistil which receives the pollen-grains.

Stipule—A leaf-like growth at the base of a leaf or leaf-stalk ; stipules may be *free* (*Violet*) or *adnate* to the petiole (*Strawberry*).

Style—The portion of the pistil intermediate between the ovary and the stigma.

Stolon—A prostrate branch ending in a tuft of leaves which becomes detached and roots itself.

Strobile—A catkin-like inflorescence with large bracts (*Hop*).

Superior (of calyx)—Apparently above the ovary ; (of ovary)—above the calyx.

Subulate (of leaves)—Awl-shaped.

Syngenesious (of stamens)—Where the anthers are coherent, the filaments being free (*Compositæ*).

Tetradynamous (of stamens)—Four long and two short (*Cruciferæ*).

Thyrse—A pyramidal panicle (*Privet*, *Lilac*).

Trifoliolate (of leaves)—Having three leaflets (*Clover*, *Laburnum*).

Turbinate—Top-shaped.

Umbel—An inflorescence composed of numerous flowers on stalks springing from a common point ; umbels may be *simple* (*Cowslip*) or *compound* (*Umbelliferæ*).

Unisexual (of flowers)—Having either stamens and no pistil, or pistil and no stamens.

Utricle—An inflated tubular structure surrounding the pistil (*Carex*).

Versatile (of anthers)—Attached to a long slender filament (*Plantago*, *Grasses*).

Vittæ—The oil-glands in the pericarp of Umbelliferæ.

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